Foley, Cindy T SAJ

From: Rex Mullen [rex_mullen@hotmail.com]
Sent: Friday, September 09, 2005 2:18 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Mid-Reach Beach restoration.

Army Corps of Engineers
Jacksonville District

RE: Mid-Reach in Brevard Count

Dear Ladies and Gentlemen;

My name is Rex Mullen and I live at 2085 Hwy A1A #3302, Indian Harbour Beach, Florida 32937. I attended the September 8th meeting at Satellite Beach High School. I have also attended several meetings regarding the Mid-R including a meeting with a Coastal Tech Engineer for our condo association.

My general understanding is:

1. The Brevard Beaches were gaining sand and width prior to the building of the Cape Canaveral jetty in 1950
2. A sand by-pass plan was discussed, agreed to, or planned after the jetty was built but never implemented.
3. The Federal Government and the Army Corps of Engineers resolved a dispute or resolved a legal settlement the State of Florida and or Brevard County to share in the cost of beach replenishment for 50 years from 19 the north and south reach and 50 years from start for the mid-reach.
4. The jetty is an important economic asset to Brevard County.
5. The near shore rock that the Fish and Wildlife association wants to protect would not be exposed today if tl jetty had not been built.
6. Revetment or beach armoring is strongly apposed by the Turtle Preservation Society.
7. Dune and Berm Fill has a fairly short life expectance 1-5 year.
8. Conventional beach fill has a 4-8 year life expectancy.
9. Groin Fields adversely affect the down shore properties.
10. Not taking care of this problem today could cost Brevard County, the State of Florida and the U.S. much mc the future. □Penny wise and Pound foolish□ should not be government policy as it was in New Orleans.

A Logical Solution after taking all of the above into consideration would be:

1. In the short term do a complete □Conventional Beach Fill□ and a □Dune Fill□.
2. For the long term implement a sand by-pass system at the Canaveral Jetty.

Benefits:

1. The sand by-pass should reduce the need and cost to dredge the Canaveral shipping channel.
2. The sand-by pass would reduce or eliminate the need to continually do beach fill in the North, South and Mi reach of Brevard County for the next 50 years.
3. The by-pass program could continue for as long as the Canaveral Jetty exists.
4. This would protect the turtle nesting, return the beaches to a status that existed when many more fish were in waters than there are today and it would protect some of your employer□s property, the Brevard County Bar Island habitants and tax payers.

Thank you for the opportunity to comment.

Rex Mullen

Foley, Cindy T SAJ

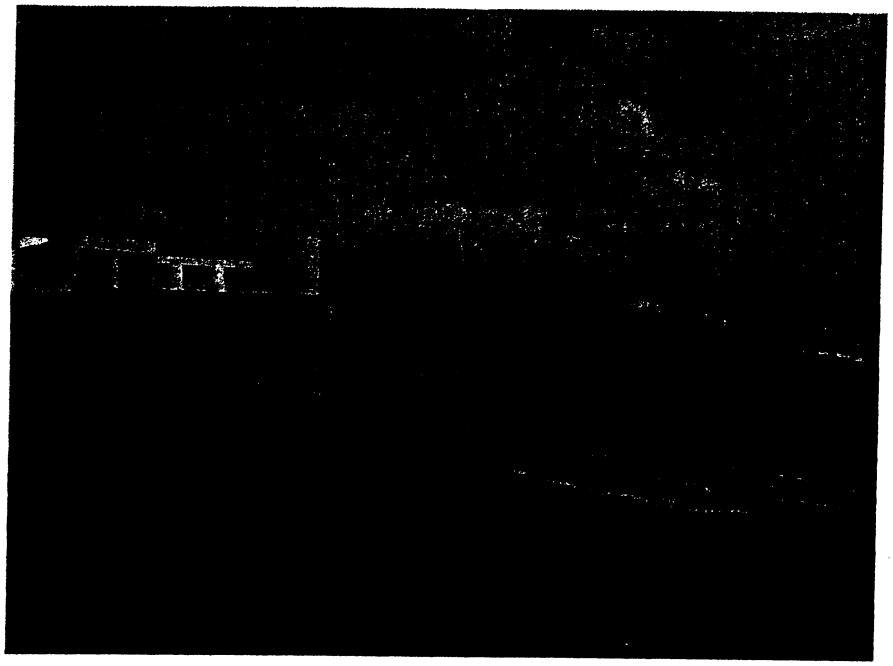
From: TLOIZZO@AOL.COM
Sent: Sunday, September 11, 2005 4:47 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Brevard Co. Shore Protection Project Mid-Reach

Photo's taken on 090805 at below mid-reach address.

Owners: Tony & Linda Loizzo
1665 Highway A1A
Satellite Beach, Fl. 32937

Please repair the damage done to the mid-reach becah when you added the jetty to the port. The north and south beaches have been repaired. Now we need you to do what ever it takes to repair the mid-reach beach. The water is at the foot of our dunes. When they fail, the cost of repairs will be much greater in the future I did say WHEN, because just like New Orleans, it's just a matter of time. With 12 to15 hurricanes a year we can't wait 5 years.

PLEASE HELP US NOW



How to save a picture
Simply right click on it and select "save image as." Mac users, click and drag the image to your desktop.

Foley, Cindy T SAJ

From: ITCSMITH@aol.com
Sent: Sunday, September 11, 2005 1:04 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Brevard County Shore Protection Project, from Carol J. Smith

To U.S. Army Crops of Engineers

This week I attended the meeting presented by the Army Corps concerning the restoration of the mid-reach area. My husband and I sold our home two years ago to fulfill our dream of living on the beach.

As we are from Nebraska, we had no idea the Army Crops made a slight error deciding which way sand flows when they built the Port Canaveral jetty. From the meeting, I realized the Army Crops is analyzing the beach situation, but it could take up to 5 years to develop a plan. Our home is in the emergency situation, following the two hurricanes from last year.

I compare our situation to that of the New Orleans disaster. There was a know problem, but because of bureaucracy nothing could be done.

I realize that fish are an important part of our ecology, but the precious rocks we are now protecting were not even exposed before the original faux pas caused by the miscalculation of sand flow.

Please consider the tax payer/home owner's plight--help us make our beach a great place for homes, people, fish, turtles, surfers, fishermen and women; just like it was before the port was built, and can be again.

Thanks for your consideration.

Carol J. Smith
2835 North Highway A1A, #801
Indialantic, FL 32903

8 Sep 2005

TO: U.S. Army Corps of Engineers
CESAJ-PD-EA
P.O. Box 4970
Jacksonville, Florida 32207

FROM: William A.Rose
124 Palm St
Windermere, FL 34786

SUBJ: Comments Re: Army Corps of Engineers Public Comment Mtg
Satellite Beach, FL Thursday, Sept 8,2005

First, I want to thank the Corps and your staff specifically for the presentation given in Satellite Beach regarding the Mid-Reach Beach Re-nourishment program Plan.

My comments are as follows:

1) Your presentation did not acknowledge the current sense of emergency with the deteriorating condition of the mid-reach beaches.
2) Your plan to start re-nourishment as early as November 2009 assumes we will still have a barrier island in the mid-reach area. Given the damage done in 2004 and the lack of help from the Corps in the mid-reach area, it is doubtful we will still be on the island.
3) The Corps did not acknowledge the critical and emergency conditions nor did you respond to our assertion of an emergency existing.
4) Given you acknowledge the emergency conditions now, why couldn't construction start in 2006?
5) There was no dialogue in the presentation with the audience. For example, I asked for the Corps' response to our statement of emergency conditions existing on the mid-reach beaches now.

Thank you again for your time and I would appreciate your response back to me.

William A. Rose

124 Palm Street
Windermere, FL 34786
E-mail Ramblerbill@cfl.rr.com

DONALD A. KRAUS

1125 Hwy. A1A, #906, Satellite Beach, FL 32937-2433

Telephone: 321-779-9040, Fax: 321-779-9040, E-mail: dakraus2@aol.com

September 9, 2005

U.S. Army Corps of Engineers
CESAJ-PD-EA, P.O. Box 4970
Jacksonville, FL 32207
Attention: Mr. Paul Stadola

REF: BREVARD COUNTY SHORE PROTECTION PROJECT
MID-REACH SEGMENT, GENERAL RE-EVALUATION REPORT

Dear Mr. Stadola:

I had the pleasure of attending your public meeting last night and am responding today, as I had to leave before the end of the meeting. The questionable (either intentional or unintentional) timing of your meeting at 5:30 PM, upset my normal dinner plans, as I'm sure it prevented many others from attending. The following are my salient comments:

- I am a retired engineering executive, formally vice president of an environmental engineering company, president of an environmental products company, and engineering vice president of a fortune 500 company with full responsibility for environmental issues throughout the country. I now live in a beachfront condominium in Satellite Beach and am greatly concerned about my money being wasted on lugging sand up and down the beach. I am also frustrated by remedial proposals that have *no chance* of preventing a disaster to the people of Florida, were they to experience a storm equal to Hurricane Katrina. ***We are facing an EMERGENCY in Florida now...except it hasn't happened yet!***

- Florida taxpayers are now paying $1.5 million per mile to replenish 814 miles of minimally protected shoreline, only to watch it wash away every time we experience stormy weather. A better method is needed because nothing is being done to keep the sand in place! Initial costs must be considered, of course, but long-term costs are even more important. If the chief engineer of my companies had proposed such a fiscally irresponsible remedy he would have been fired!

- No plan, however, to withstand the forces of a category 4 of 5 hurricane will succeed without providing ***two basic protective elements:***
    1. **Armoring the beach,** either with an adequate revetment or groin, to protect the existing dunes and properties from the violent forces associated with high surf conditions **Only rocks** can withstand the heavy beating from any hurricane. In Flagler Beach truckloads of rocks are being used by the DOT to prevent further erosion from a category 1 hurricane that has caused damage to Highway A1A. The causeways to the mainland are being protected by rocks placed at the waters edge to prevent erosion. Highway A1A and the causeways are the only escape route for thousands from the barrier islands. Thousands of years of experience around the world have proved that only rocks can withstand the power of a huge surf. The shoreline of Hawaii is an excellent example...and who gets higher surf?

U.S. Army Corps of Engineers
CESAJ-PD-EA, P.O. Box 4970
Jacksonville, FL 32207
Attention: Mr. Paul Stadola

2. **Rock jetties** built out into the ocean to capture the drifting sand. The Cape Canaveral jetties, although on a much larger scale, are a perfect example. The sand trapped there has to be removed regularly in order to provide clearance for ships to traverse the channel. Such jetties will capture the drifting sand from both the north and south ocean currents to the point that the sand buildup will build up to the top of the jetties...and eliminate the need to truck sand to the beaches...***and fish LOVE jetties!***

On the same day of your meeting Governor Bush created a Coastal High Hazard Study Committee with the comments that "*Knowing what we know now, I think it would be inappropriate to sit back and say something is going to happen and it will all work out.*" The Governor is asking for a better method, it must be frustrating for him to realize that in spite of all the money spent on beachfront erosion nothing has yet worked... and there appears to be no end in sight!

The corps states that, "***If*** the project is approved ***and*** funded by Congress, ***construction could begin as early as November 2009."*** (Emphasis mine).After studying this for nine years the corps. still has no final plan ***and no urgency is implied!*** For a project that began in 1996, bureaucratic and petty environmental issues have since placed the lives and fortunes of thousands of Brevard residents in jeopardy. Ask the residents (at least those left) of New Orleans to what effect are environmental restrictions on their lives today.

There is a great difference between a ***"normal"*** project and an ***"emergency"*** project in the eyes of the Corps. But as we have learned from the results of Hurricane Katrina, congress is quick to approve requests for funding for projects ***after the fact***. As I write this letter we have Hurricane Ophelia, gaining in intensity and parked 60 miles from where I am sitting. Perhaps the term "emergency" depends upon your proximity to a disaster... ask those same folks from New Orleans for their description.

I appreciate this opportunity to offer my suggestions, however I feel sad knowing they will be like palm fronds blown in the winds of a hurricane when compared to the mandates of those who are well established in the government. They have personal goals and objectives that exceed that of the people of Florida...***like me!***

Sincerely yours

Donald A. Kraus

C: J. Bush, Governor, State of Florida
M. Marteniz, U.S. Sen.
B. Nelson, U.S. Sen.
D. Weldon, U.S. Rep
M. Hairidopolus, State Sen.
M. Needleman, State Rep
R. Pritchard, Chrmn.,County Comm.
J. Colon, County Comm.
M. Brimer, Mayor , Sat. Bch.
N. Reed, Pres., Buccaneer Beach Club Condo. Assn.

Comment Sheet

Thank you for attending this evening's workshop. We value your contribution. If you would like to provide additional comments on this evening's presentation and discussion, please fill in the information below and return it to us. To guarantee that your comments are considered prior to the completion of the draft **Brevard County (Mid-Reach) Shore Protection Project General Re-evaluation Report** **they must be received or postmarked by October 8, 2005**. Comments may be sent to the address listed on the back of this form, or e-mailed to: **publicmail.cesaj-cc@saj02.usace.army.mil.**

Comments:

How sad! How ironic that we are holding a meeting to note in the shadow of the New Orleans disaster!

Haven't we, haven't you learned anything about the cost of prevention VS. cure?

In 5 yrs. our beach and most of our condos will not be here.

Name and address (optional)

Ben Traum
245 Hwy A1A #201
Cape Canaveral Fl. 32953

Name and address (optional)
PATRICIA TRAINA
245 HWY A1A # 201
Satellite Beach, FL 32937

Comments Continued:

As I see it, there are two important facts in this situation:

1) Sand along these coasts is moving north to south.
2) 1953-54 the ACOE built and expanded jetties for cruise ship traffic fully expecting significant erosion in the Mid Reach beaches, because the jetty expansion interrupted the normal flow of sand.

Thus, the ACOE did environmental damage to our beaches and by allowing the situation to continue for 50 years compounded the environmental damage. Environmental damage on top of environmental damage.

And now we are to accept the ACOE's excuse for doing nothing to correct the situation: namely, that adding sand would cause environmental damage....ENVIRONMENTAL DAMAGE! - What's been happening year after year since 1953?

It's a slap in the face! An ironic outrage that only a powerful, bureaucratic entity could dream up.

Don't tell us about environmental damage in the year 2005 when you folks have been perpetrating 5 plus years of environmental damage. Now, we only want to hear about correcting the on-going damage, that caused by the jetty expansion. No more excuses. No more studies.

Patricia Traina

*Additional sheets may be attached if necessary

Letters must be postmarked by October 8, 2005, and may be mailed to:

U.S. Army Corps of Engineers
CESAJ- PD- EA
P.O. Box 4970
Jacksonville, Florida
Phone: 904-232-3271
Email: Paul.E.Stodola@saj02.usace.army.mil

To: The Army Corps of Engineers
Jacksonville, Florida
September 12, 2005

Picture: a 7 mile stretch of beach with scores and scores of derelict, abandoned hotels, resort and apartment buildings, condos and private homes made unliveable, unsafe by the twice daily flow of ocean water rushing in on them to a depth of a mere 2 or 3 feet.

Picture: the extensive national media coverage of this disaster with photos of these dead buildings and their debris floating, floating in and out with the tides.

Picture: all the Brevard beaches from Patrick Air Force Base south to Indialantic having become a seaside junkyard, dangerous and unfit for play, surfing or fishing, and unusable to the turtles who have always nested there.

Picture: the incomprehensibly difficult and financially devastating task the County Commissioners and other public officials will have in demolishing and cleaning up the 7 miles of dead buildings.

Picture: the hole in County public and private revenues caused by the loss of 100's of millions of dollars each year in real estate taxes, restaurant patronage, tourist dollars, drastic falls in sales in stores and businesses of all descriptions from supermarkets to strip malls to mom and pop stores, construction companies...the list goes on.

Picture: Brevard going from an extremely tight labor pool to an area of wide-spread under-employment or, worse, unemployment.

Will this nightmare be our Brevard? With more storms and no beach restoration to counter them, the answer is a resounding, disheartening yes! This is no mere scare mongering.

Nearly 100% of the buildings along this coast have lost much of the sand covering the public beaches fronting them. These beaches have to be renourished now to the state they were in before the Army Corps of Engineers, with false promises, built the Port Canaveral jetty which prevents natural replenishment.

Opposition to renourishment due to hostility to the new buildings is to "cut off your nose to spite your face". The new buildings did not cause the loss of the beaches. The loss of the buildings will not bring the beaches back. Only thorough beach renourishment will accomplish that. Our beaches are truly a magnet to continued growth and well-being.

Sincerely,
Ben and Pat Traina
245 Highway A1A apt. 201
Satellite Beach, FL 32937
321-779-4433

Foley, Cindy T SAJ

From: Cliff Dickinson [cliff@instructional-dimensions.com]
Sent: Saturday, September 17, 2005 11:12 AM
To: publicmail.cesaj-cc@saj02.usace.army.mil.
Subject: Brevard's Midreach Beaches

I want to log my agreement with the following note sent to you by Mr. Papenhausen. We live on the beach front and reside here year round. We watch the beach change daily. We have seen the rocks, that are such a concern, in various stages from being uncovered to completely covered with sand. It changes with every event from storms to gentle wave action. My point is that sometimes they are covered up after a week of calm wave action. What then could possibly be the problem if they were covered up all the time? When these rocks are covered up the fish simply make do with what is available with what is there. There is no evidence that these fish are doing better now that erosion has occurred. This is a very convoluted from of thinking in the first place. Usually the environmentalist claim is that man's intervention makes life worse for lower life forms. When the Canaveral inlet was first cut that was intervention by man. One of the side effects of that inlet and subsequent building of a jetty, which was more intervention by man, caused erosion that is still taking place. This erosion has exposed the underlying rock that formerly supported the beach. It is so obvious that we need to protect the beach with re-nourishment that I find it hard to believe that it is even up for discussion. No logically thinking person can possibly arrive at the conclusion that the best solution is to not establish a common dune line and protect that dune, and Brevard's property, with a well nourished, elevated beach. This is not rocket science. When weighed in the balance the pros versus cons of this subject, the pro re-nourishment arguments far outweigh the con. We are in a state of

EMERGENCY!

It boggles the mind that there are those that think we should try to wait 5 more hurricane seasons to maybe get approval to re-nourish Brevard's mid reach beaches. This is simply not acceptable. It is ASININE! (according to Webster online asinine means "marked by inexcusable failure to exercise intelligence or sound judgment."

Here is a bit of my logical, sound judgment for you. The truth hurts. If the shoe fits wear it. If the shoe hurts don't wear it. Don't let this "shoe" fit your decision. Re-nourish the mid reach now and lets get on to more important things. We have all wasted too much time and resources on this subject.

Cliff Dickinson
1941 Highway A1A #206
Indian Harbour Beach, FL 32937

----Original Message-----
From: Cuttycaptain@aol.com [mailto:Cuttycaptain@aol.com]
Sent: Saturday, September 17, 2005 1:00 AM
To: publicmail.cesaj-cc@saj02.usace.army.mil.
Subject: Brevards Midreach Beaches

We reside in Indian Harbour Beach in Brevard County Florida, and recently watched hurricane Ophelia with great apprehension. It appears that we have been spared any major damage from this storm, but we still have another half of the hurricane season to go. We have been particularly concerned these days as we lost about 30 feet of dunes last year (to multiple hurricanes) and our beaches have never been restored.

When we moved here five years ago it was our understanding that to compensate for the effects of the construction of the Canaveral jetties, the ACOE was to mitigate and renourish the beaches South of the inlet, for fifty years. In 1996 the Mid-re beaches were removed from the ACOE's renourishment plans because (the expected) erosion had exposed rock outcropp that Marine Fisheries subsequently designated essential fish habit. The deleted 7.6 miles of shoreline was to be studied to determine what mitigation was required before restoration could be begun. As I'm sure you know, government inaction and removal of allocated funds by the current administration prevented initiation of the GRR study until last year. It is our understanding that the independent studies that were done, failed to identify any endangered species or prove that the sporadically exposed rock out cropping actually was an "essential" fish habitat.

We have been informed that the recent "optimistic" ACOE projections for sand on the beach (assuming funding is obtained) 2009 to 2010. That's at least FIVE hurricane seasons from now, and odds are that our homes will not be here by then. We a also extremely concerned that the Port Canaveral sand bypass has not been funded by the legislature and seven years of c normal replenishment sand is amassed on the North side of the inlet.

It now appears that a lack of government funding for ACOE projects was a major factor in the New Orleans disaster. It's alsc become apparent that many other ACOE projects are not being funded and could result in additional catastrophes. Florida's shoreline is rapidly eroding and roads are disappearing into the surf in areas like Flagler and New Symrna. We have house condo's along the Mid-reach that have collapsed or are now just feet away from the waves. Most of the turtle nests along th reach have been washed away or submerged, and much of the dune and dune foliage is now gone. This allows building anc streetlights to be visible on the beach, which confuses any surviving hatchlings and draws them to their death on A1A.

The Mid-reach beaches have also been embroiled in a bureaucratic snafu that has prohibited a timely resolution of the issue and exposes billions of dollars of real estate to potentially catastrophic damage. The mitigation requirements are unnecessa unrealistic, and will add unacceptable time and tens of millions of dollars to a project that needs to done now.

It's clearly time for this country to refocus its priorities. Tax cuts should not take priority over people's safety, their property, o livelihood. Worm rock is not more important than people's lives. The tragic miscalculations made in New Orleans will cost taxpayers hundreds of billions of dollars whereas fixing the levee and erosion problems before hand would have cost a mere fraction of that.

It appears that the Federal Government is financing their tax cuts by reducing or eliminating funding and services that are cr to the safety and well being of our citizens. This is clearly putting people's lives and property at risk. The taxpayers of Brevar Mid-reach beaches need the ACOE's help to champion our cause and assist in resolving the bureaucratic mess that we have been forced to endure. We are fighting unnecessary red tape, we are in and emergency situation, and we will not survive her until 2010. We need to have our beaches and dunes restored immediately. We also need your help to get congressional app for ongoing funding for the Canaveral sand by-pass, and thereby restore the normal flow of replenishment sand to our beach Please advise as to how we can work together to make this happen.

Sincerely,
Bill Papenhausen
1941 Hwy A1A, Unit #205
Indian Harbour Beach, Florida

We reside in Indian Harbour Beach in Brevard County Florida, and recently watched hurricane Ophelia with great apprehension. It appears that we have been spared any major damage from this storm, but we still have another half of the hurricane season to go. We have been particularly concerned these days as we lost about 30 feet of dunes last year (to multiple hurricanes) and our beaches have never been restored.

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It appears that the Federal Government is financing their tax cuts by reducing or eliminating funding and services that are critical to the safety and well being of our citizens. This is clearly putting people's lives and property at risk. The taxpayers of Brevards Mid-reach beaches need the ACOE's help to champion our cause and assist in resolving the bureaucratic mess that we have been forced to endure. We are fighting unnecessary red tape, we are in and emergency situation, and we will not survive here until 2010. We need to have our beaches and dunes restored immediately. We also need your help to get congressional approval for ongoing funding for the Canaveral sand by-pass, and thereby restore the normal flow of replenishment sand to our beaches. Please advise as to how we can work together to make this happen.

Sincerely,
Bill Papenhausen
Indian Harbour Beach, Florida

D.O.A. Inc.
"The Unfair Advantage"
Fishing Lures

1253 SE Dixie Cutoff Rd
Stuart, FL 34994

Tel: (772) 286-5001
Fax: (772) 287-3843
E-Mail: doalures@adelphia.net

September 30, 2005

Army Corps of Engineers Jacksonville District
ATTN: Paul Stodola
PO Box 4970
Jacksonville, FL 32232

Re: Brevard Mid-Reach Project Comments

Dear Mr. Stodola:

As the president of one of the largest lure manufacturing companies in Florida, I am greatly concerned with the proposed Satellite Beach project in Brevard County. The Space Coast represents one of our most important areas of retail sales. This reef provides essential habitat for juvenile snapper, grunts, groupers and seasonal habitat for a variety of game fish such as snook, red drum, pompano, tarpon, and speckled trout. In fact, this stretch of beach is one of the most celebrated areas for tarpon in the state. Damage to this reef will impact fish populations in both the ocean and the Indian River and Banana River lagoons. Adverse impacts to fish populations directly impact the economies of coastal areas, including businesses like mine.

These "dredge projects" don't work well; they last for a few years at most. They are expensive and unsustainable short term pork barrels. Two perfect examples to highlight are the Martin County "dredge and fill" project completed in April, which is now 80 percent gone at untold ecological expense, and the 2001 $7 million Juno Beach project which washed away after one 17-day-long nor'easter.

Furthermore, I feel comfortable to speak for my customers that we resent our tax dollars being used for short term protection of a few oceanfront condos at extensive ecological expense. Beyond impacts to Essential Fish Habitat, these projects are notorious for interfering with sea turtle reproduction. These massive "dredge and fill" projects also eliminate sandfleas and coquina clam populations, which are essential forage for fish and birds. As an example, I invite you to take a walk on my local "re-nourished" Stuart beaches. In the middle of the fall bait run, you will find the beach devoid of bait, sandfleas and predator fish. And fishermen.

Assuming the results will be comparable—and they will be--more than seven miles of highly productive Brevard reef will be taken from anglers and therefore will impact my business.

Sincerely,

Mark Nichols
DOA Lures

Foley, Cindy T SAJ

From: Brian Bienkowski [bbienkowski@crownrelo.com]
Sent: Friday, September 30, 2005 3:03 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Save the Brevard Nearshore Reef

Save The Brevard Nearshore Reef

I am a Florida citizen asking you to please save the Brevard Nearshore Reef and do not go ahead with the so-called "beach renourishment" project.

These projects satisfy the rich few and destroy the nearshore habitat for the rest of the hard working Florida citizens.

Brian Bienkowski
PR and Events Specialist
Crown Relocations
Our New Address:
5827 Corporate Way
Suite 201
West Palm Beach, FL 33407
561-491-0940 phone
561-491-0941 fax
http://www.crownworldwide.com

Foley, Cindy T SAJ

From: Peteoknudsen@aol.com

Sent: Saturday, October 01, 2005 4:38 PM

To: CESAJ-CC, PublicMail SAJ

Subject: beach restoration

Although I know the intentions are good I believe the beach restorations are one more example of political favoritism at the cost of the taxpayers and it is a gross misuse of public money even if it worked as a permanent solution, which it does not!!! If it wasn't so disgusting it would be comical that those responsible are simply throwing $$$$$$$$$$$$$$$ s out to sea. Pete Knudsen

From: Doug Olander [mailto:Doug.Olander@worldpub.net]
Sent: Monday, October 03, 2005 8:14 PM
To: CESAJ-CC, PublicMail SAJ
Subject: rethink brevard dredging

I want to register my concern with the ecological and economic impacts of dredging along the Brevard County coastline in another "beach replenishment" project aimed at meeting demands of developers. The long-term damage to this Habitat Area of Particular Concern would be substantial, negatively affecting game fish, sea turtles and coral.

Doug Olander

Doug Olander
Editor in Chief
***Sport Fishing* Magazine**
doug.olander@worldpub.net ; 407-571-4576
460 N. Orlando Ave. Suite #200 Winter Park, FL 32789

US Army Corp of Engineers
ATTN: Paul Stodola
P.O. Box 4970
Jacksonville, FL 32232

Save The Nearshore Reef in Brevard

Attention: Paul Stodola,

I am a hard working Florida citizen who does **not** want the so-called "beach renourishment" project in Brevard to be executed. It is time to look after the nearshore habitat and the people of Florida – not the few beach front property interests.

Scientific studies have identified more than 530 marine organisms including 320-plus fish and invertebrates. Rightfully designated by NOAA Fisheries as Essential Fish Habitat (EFH) and a Habitat Area of Particular Concern (HAPC), reefs such as the Brevard Nearshore Reef provide critically important habitats for reef fish.

I say no more bowing down to the rich few. Let's start taking care of the millions of Floridians that actually care about the environment and the quality of life it affords us. Stop this dredge-and-fill project.

Not only is Army Corps in Florida responsible for the destruction of wetlands (third in the country!) but the Corps also plays a large part in this dreadful practice of destroying marine and bird life to satisfy the beach front wealthy.

How about a change? Mr. Stodola, we need to do what is right and, yes, we need your help. Save the environment, not the beach front homes.

Thank you for your time.

Brian Bienkowski

Deborah H. Davis
101 Berkeley Street
Satellite Beach, FL 32937

October 5, 2005

US Army Corp of Engineers
ATTN: Paul Stodola
PO Box 4970
Jacksonville, FL 32232

Dear Army Corp of Engineers,

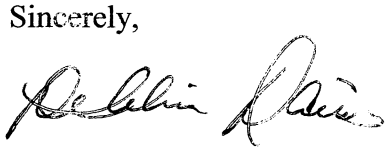
This letter is to let you people know that most of us Brevard County residents do not want any dredge and fill in the "mid-reach" area; and to also let you know I don't think it was very fair the way you conducted the Scoping Meeting at Satellite Beach High School on September 8, 2005.

Attached is a copy of 5 letters written to the *Florida Today* newspaper that appeared in the paper on September 14, 2005. Every one of the 5 articles expresses the opinion of most Brevard County residents that the proposed dredge and fill project for the Brevard County mid-reach is both ineffective and a waste of tax payer's money. I also have other copies of other letters written by Brevard County Residents that have appeared in *Florida Today* and the local weekly *Hometown News*. Those condo owners that chose, on the own volition, to buy a condo on top of a sand dune did so at their own risk. I don't see why they are calling for the Corp, the County and the rest of us taxpayers to pay for their mistake. And this project will destroy a valuable near shore reef that is critical to the overall eco-system of the area. Destroying the reef will have a huge negative economic and environmental impact on this stretch of beach.

As for the meeting at Satellite Beach High School on September 8, 2005, I was appalled at the way that condo group was allowed to dominate the first portion of the meeting with their presentation. I had seen the advertisements announcing the meetings and did not remember seeing anything about inviting interested groups to prepare and present a program to express their views. To my knowledge, everyone else was limited to only 4 minutes. I even went back after the meeting and made copies of the announcements on both your web site and the Brevard County web site, and neither one said anything anyone being invited to or able to make a long presentation. My question to you is: How did they get the authority to make such a presentation when other groups may have wanted the same treatment? Also, why were the people that gave the presentation allowed to make more statements during the "public" portion of the meeting, after the moderator suggested that they had already had their say during their presentation?

The dredge and fill is a bad idea, we the people of Brevard County do not want it, and those condo owners should not be given preferential treatment – even if they have made poor real estate decisions.

Sincerely,



Debbie Davis

CC: Honorable Senator Bill Nelson, Washington, DC
Honorable Representative Dave Weldon, Washington, DC
Commissioner Ron Pritchard, Brevard County, FL
Commissioner Jackie Colon, Brevard County, FL

SEPT. 14, 2005; Florida Today; 5 letters from throughout Brevard county.

Shoring up the beaches

Rebuilding beaches a waste of time, sand

There was an interesting juxtaposition in Friday's FLORIDA TODAY.

The lead article in the Space Coast section described local beachside residents searching for ways to replenish the beaches as soon as possible.

But an article on the State page said Gov. Jeb Bush is contemplating not restoring the beaches at all.

While I usually don't see eye to eye with our governor, this time I do.

Florida's beaches are the result of barrier islands, which are sandbars that are above sea level under normal conditions. One cause of beach erosion on these islands is the jetties that disturb the natural offshore flow of sand.

However, like any other sand-based deposit, barrier islands migrate as sand is naturally eroded in one place and built up in another.

Unfortunately, roads, buildings and houses do not migrate with them.

If I built a home in an area that constantly flooded, I would not expect the government to replace my [illegible]

We should not be throwing good money after bad to replace sand that will wash away as fast as we put it down.

Patrick Bryan
Grant

File photo

Beach projects. Sand is shoveled under a dune crossover after a portion of south Cocoa Beach was renourished in 2001.

Let's try new mindset in dealing with erosion

Some residents have expressed legitimate concerns about beach erosion, such as that caused by tropical systems near our shores, as Ophelia did last week.

Not all of us agree that taxpayers should pay the bill for dumping more sand on the beach, only to watch it wash away in the next storm.

Gov. Jeb Bush suggested a better idea: Reconsider the blank check approach to beachfront development and unquestioned "renourishment."

I'd suggest a few other ideas:

- Let nature work it out. Sand has always moved in and out, and over time beaches tend to heal themselves. Scientists know more about this than developers.
- Artificial replenishment rarely works. The Corps of Engineers has studied this for decades and knows a lot about it.

beaches and everyone could enjoy them. Now we have condos, apartment buildings and businesses blocking the view.

Our elected officials want more businesses and tell people to come to Florida. But in the next breath they tell us not to water our lawns because of water shortages.

I was born here and remember when it was beautiful and we could swim in the river.

Progress is the controller, and big money feeds the ones in control.

Sandra Cossairt
Grant

Make beach dwellers pay advance on sand

The headlines Friday in FLORIDA TODAY read: "Residents plead for sand."

Anyone who builds a home on the beach apparently doesn't understand basic geology. No matter how many times the beaches are replenished, unstoppable processes will predominate.

Beach replenishment is not free. Guess who pays for it? Not the homeowner, but the taxpayer.

A partial solution to this problem would be to require those who build

money after bad to replace sand that will wash away as fast as we put it down.

Patrick Bryan
Grant

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Gov. Jeb Bush suggested a better idea: Reconsider the blank check approach to beachfront development and unquestioned "renourishment."

I'd suggest a few other ideas:

- Let nature work it out. Sand has always moved in and out, and over time beaches tend to heal themselves. Scientists know more about this than developers.
- Artificial replenishment rarely works. The Corps of Engineers has studied this for decades and knows a lot about it.
- A small sand trap or jetty may capture some sand, but it usually comes from some other part of the beach where it creates even more erosion. Satellite Beach has numerous examples.
- So-called "renourishment" costs too much, and its benefits are too few. Last year's price tag for taxpayers was more than $140 million, and it didn't really work out very well.

Our local newspaper could help the public understand these issues much better if it did a better job reporting the science and politics involved.

Sanders LaMont
Satellite Beach

Coastal builders drive beach policy

When will our elected officials make the developers stop running the show?

They let them build right to the edge of the ocean. Then the developers get mad because the government won't pump more sand that cost millions, to be washed away year after year.

I realize people like the ocean, but building so close comes with problems.

SEPT. 14, 2005

them. Now we have condos, apartment buildings and businesses blocking the view.

Our elected officials want more businesses and tell people to come to Florida. But in the next breath they tell us not to water our lawns because of water shortages.

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Beach replenishment is not free. Guess who pays for it? Not the homeowner, but the taxpayer.

A partial solution to this problem would be to require those who build on the beach to provide a substantial deposit covering the cost of beach replenishment.

The same approach would apply to anyone building a home in a hazardous area, such as Californians who build expensive homes on the San Andreas fault.

Donald E. Zimmerman
Satellite Beach

Don't make us pay for fight with nature

Our beaches, just by nature, are bound to erode faster — eventually, Florida will be a much narrower peninsula.

So why do we pay for the homes that are destroyed over and over? And why do we bring the sand when these homeowners yell for it after storms?

The beaches should be public and not theirs only. With their riches, they should not be allowed to rebuild beachside.

It is our money being used to replenish the beaches. Don't these property owners and our government realize the force of nature, and how little by little our state will be eaten up?

Jane A. Farmer
Suntree

FLORIDA TODAY

Richard L. Hayes
101 Berkeley Street
Satellite Beach, FL 32937

October 5, 2005

US Army Corp of Engineers
ATTN: Paul Stodola
Post Office Box 4970
Jacksonville, FL 32232

Dear Mr. Stodola,

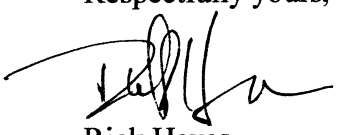
I am writing regarding the Army Corp of Engineers proposal to perform a dredge and fill project on Brevard County's "mid-reach" to solve a purported erosion problem. Overall beach erosion is a process, not a problem. Where the real problem lies is that our government continues wasting taxpayer dollars by dumping our money into these unwise Army Corp of Engineers beach dredge and fill projects. These projects subsidized wealthy beachfront condo owners who have made poor, long term, real estate decisions by building on our beach's shifting sand - an extremely high risk area. These money-draining projects not only erode away the finest fibers of our society; they are also destructive to the core of the quality of life for the rest of the residents and visitors.

In this particular situation concerning dredge and fill operations along Brevard County's central beaches, the stakes are even higher and more critical than normal. The beaches under consideration for this ACOE project are home to a unique inshore reef and estuary system. These reefs are part of our communities' heritage. I, my children, my neighbors and their children (not to mention many, many visitors) surf, fish, dive and play over these living reefs. This complex reef system is also designated essential fish (and turtle) habitat by our federal government. Besides being home to hundreds, if not thousands, of green turtles, and several other federally protected fish and turtles, our inshore reefs are also nurseries for hundreds of marine species including popular game fish such as snook, pompano, tarpon and redfish. Our inshore reefs are actually a very important extension of the federally protected Indian River Lagoon estuary system.

I feel dredge and fill operations are not only a waste of taxpayer's dollars, but also harmful to this area's unique marine resources and our community's heritage. Furthermore, our community's economic base, which is strongly structured around eco-tourism, fishing, diving, surfing, and a healthy ecosystem, will be negatively impacted by any foolish dredge and fill projects.

I strongly suggest the only viable, long term solutions towards improving coast management are to effectively restrict coastal development and immediately begin managed retreat from the ocean's shorelines. However I doubt these options will be seriously considered, based by the past history of coastal management and the Army Corp of Engineers involvement. Before dredge and fill operations are permitted on our beaches (which will certainly inflict heavy damage on our inshore reefs) I can only hope and trust we use the best science available to better protect our quality of life and stop the foolish waste of taxpayer's dollars.

Respectfully yours,



Rick Hayes

Your Lifeline to Florida's East Coast Waters

Coastal Angler

P.O. Box 373257, Satellite Beach, FL 32937-1257 Ph: 321-777-2773 Fx: 321-777-4622
Email: cameditor@cfl.rr.com www.coastalanglermagazine.com

October 5, 2005

Dear Mr. Paul Stodola:

On September 8, 2005 the public meeting held at Satellite Beach High School was conducted in a biparti san, negative and alarming fashion between US Army Corp of Engineers officials, city and county government offi cials, Save Our Seashores members and the general public. The order and locations in which speakers spoke wa unfairly stacked to cooperate with those in favor of dredge and fill operations along Brevard County's central beach es.

Overall beach erosion is a process not a problem. The problem is how our government continues to wast taxpayer dollars by dumping our tax money into unwise US Army Corp of Engineers beach dredge and fill projects Overall, these projects subsidized wealthy beach front condo owners who have made poor, long term, real estat decisions by building on extremely high risk areas - beaches.

In this particular situation concerning dredge and fill operations along Brevard County's central beaches the stakes are even higher and more critical than normal. The beaches under consideration for this Army Corp o Engineers project are home to a unique inshore reefs and estuary system.

These reefs are part of our communities heritage. In the past twenty five years my wife Karen and I hav raised four children in Satellite Beach. Our family along with many other neighborhood families surf, fish, dive an play over these living reefs. These complex system of reefs are also designated essential fish (turtle) habitat by ou federal government. Besides being home to hundreds if not thousands of green turtles, our inshore reefs are als nurseries for hundreds of marine species including popular gamefish such as snook, pompano, redfish and tarpon All these species are a Aquatic Resources of National Interest. Our inshore reefs are actually a very importan extension of the federally protected Indian River Lagoon estuary system.

Dredge and fill operations are not only a waste of taxpayer's dollars, but are also harmful to this area' unique marine resources, our community's heritage and the economical ability of our government. Furthermore ou community's economic base will be negatively impacted by any foolish dredge and fill projects which is now strong ly structured around eco-tourism, fishing, diving, surfing, and a healthy ecosystem.

We strongly suggest the only viable, long term solutions towards improving coast management is to effec tively restrict coastal development and immediately begin managed retreat from the ocean's shorelines. Howeve we doubt these options will be taken seriously considering the past history of coastal management and the Arm Corp. of Engineers involvement. Before dredge and fill operations are permitted on our beaches, we can only hop we use the best science available to better protect our unique quality of life.

It's time to stop this foolish practice of wasting our taxpayer's dollars – begin with managed retreat!

Sincerely,

Rodney Smith

Capt. Rodney Smith
Publisher. *Coastal Angler Magazine*

Foley, Cindy T SAJ

From: L4Bec@aol.com
Sent: Wednesday, October 05, 2005 10:32 PM
To: CESAJ-CC, PublicMail SAJ
Subject: No Dredge and Fill

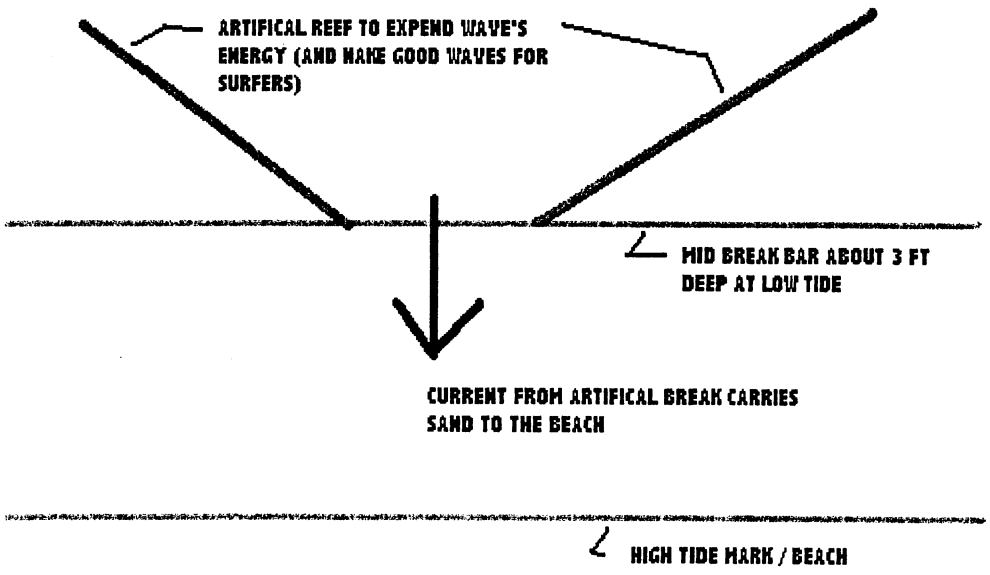
If you live near the Airport, you may hear airplanes and subsequently an airplane may land on your home. If you live Near the Indian River You may smell the river from time to time. if you live on the beach you know the risk of Hurricanes. Why should I and thousands others be made responsible for restoration of someone else's property, I do not recall people that live on the beach demanding that something be done to restore the property of all the people that do not live on the beach, sounds a little one sided? I have insurance that partially covered damage to my home I think beach residents should have erosion coverage, just as I am required to have flood hazard coverage in the area I live in. If you can afford to live on the beach you can afford to maintain the property, if not you may have to look at living somewhere you can. Dot make the problem of a number of individuals {comparatively speaking} the problem of hundreds of thousands. This financial burden is passed on to the majority that do not live on the beach in elevated insurance premiums. Choose Your Fate Choose Your Rate.

Foley, Cindy T SAJ

From: Burch, Grady [cburch@grgce.com]
Sent: Wednesday, October 05, 2005 9:54 AM
To: CESAJ-CC, PublicMail SAJ
Cc: ernest.brown@brevardcounty.us
Subject: Beach Dredge and Fill

The efforts I have seen of piling sand on the beach (or rocks) (or seawalls) are flawed. Check out the loss of sand in St Augustine if you don't believe me or the effects of seawalls at New Smyrna, at the Breakers or rocks at South New Smyrna. They all result in steep drop offs near the shore allowing the beach break waves to be more powerful causing more erosion.

As a surfer and a Native Florida, it is time to try something different. I would like to see a pilot program to dump some coquina rocks on the mid break sand bar. Top of the rocks would be about 3' ***below the low tide level*** so they would not be visible. The idea is to get the waves to break bigger, better, harder off the beaches so the shore break does not suck the sand away. A great benefit would be to enhance and add surfing spots.



FYI – Most of the best breaks in FLA are due to Army Core of Engineer projects such as Ponce Inlet north and south, Sebastian Inlet, Ft. Pierce inlet.

FYI2- RC's in Satellite Beach across from the publix's shopping center is a natural break which has coquina rocks on the bottom allowing big waves to break better reducing beach erosion – go check it out.

Public Comments due to the Army Corp of Engineers on the Midreach Beach Dredge and Fill Project. This is their intent Make yourself heard here – publicmail.cesaj-cc@saj02.usace.army.mil and copy it to Ernie Brown of Brevard County's Natural Resource Management Office – ernest.brown@brevardcounty.us

Foley, Cindy T SAJ

From: jstern571@aol.com
Sent: Wednesday, October 05, 2005 5:13 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Re: Brevard County Shore Protection Project, Mid-Reach Segment

October 5,2005

Re: Brevard County Shore Protection Project, Mid-Reach Segment

As l understand the series of events that led up to the serious erosion of Brevard County's seashore was the introduction of the jetty at Cape Canaveral, and the jetty was was put there to keep the sand from clogging the port's shipping channel.

This fooling with Mother Nature created an unnatural flow of sand away from the Brevard Beaches. The ACOE concurred and agreed to an ongoing program to renourish the beaches as they eroded. A program interrupted by lack of funding.

During the this interruption, exacerbated by several hurricanes, continuing erosion uncovered nearshore rock outcrops, that without the the jetty caused erosion, would have stayed covered and undiscovered, and would not have been a bone of contention.

We were fine when the it was natural to have the offshore rock buried in sand (pre-jetty). I think it is only right and just the beach renourishment program for the Mid-Reach be promptly reinstated as part of the Brevard Shore Protection Project. Please Find a way to speed up the lengthy study now in progress.

Please don't renege on the Army Corps Of Engineer's commitment to continue renourishing all of Brevard's beaches.

Thank you very much.

Yours truly,

Jack Stern
1175 Highway A1A, #407
Satellite Beach, FL 32937
321-773-7150
jstern571@aol.com

Foley, Cindy T SAJ

From: jstern571@aol.com
Sent: Wednesday, October 05, 2005 5:13 PM
To: CESAJ-CC, PublicMail SAJ
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Jack Stern
1175 Highway A1A, #407
Satellite Beach, FL 32937
321-773-7150
jstern571@aol.com

Foley, Cindy T SAJ

From: Tony Dickens [tdickens@solutionhost.com]
Sent: Wednesday, October 05, 2005 4:46 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Ocean recreation impact

USACE Project Management,

There is a large surfing population in the space coast region of Florida. This sport offers not only top physical exercise and conditioning, but many positive social, small business, economic, and tourism benefits for the region. The space coast has produced many of the world's top surfing athletes for the past decade.

What is being done in this project to ensure that the sanctuary of surfing in Brevard county is being preserved for not only our generation, but the future youth generations? This is a rare treasure only shared by a few states in the US (eg. California, Hawaii). It is my opinion that Brevard boast the best surfing beaches of the eastern Atlantic seacoast, due to water quality, water clarity, ocean water temperature, mixture of sand bar and rock breaks, accessibility, climate, and close proximity to growing major cities.

Thank you,
Anthony Dickens, Director
Solution Host Consulting LLC - a local small business serving US Aerospace and Defense Business Software Services in the expert SAP R/3 marketplace. Founded at the TRDA/NASA Business Incubation Center, Titusville, FL.
(321) 223 – 1199

Foley, Cindy T SAJ

From: Jeff Grammer [jdg42@bellsouth.net]
Sent: Wednesday, October 05, 2005 11:24 AM
To: CESAJ-CC, PublicMail SAJ
Subject: Brevard county "dredge and fill" project

As a long time angler who bring tourist dollars to the Brevard county area, I am VERY upset to hear about the latest efforts that would destroy vital fishery habitat in Brevard County, FL.

Please use every available means to see that this project is suspended and stopped.

Thank you,

Jeff Grammer

Foley, Cindy T SAJ

From: Bob Rohmann [bob.rohmann@quiksilver.com]

Sent: Wednesday, October 05, 2005 10:51 AM

To: CESAJ-CC, PublicMail SAJ

Subject: Dredge and fill in Satellite Beach

To whom it may concern,
when will it be realized that the so called beach re nourishment projects are a failure and disaterous to our fragile marine habitat. As a life long resident of Satellite Beach I am greatly opposed to any filling of the beaches. It is detrimental to our marine habitat and only benifits the few beachfront homeowners. Stop the madness.
br

Foley, Cindy T SAJ

From: David Finley [dafinley@earthlink.net]
Sent: Thursday, October 06, 2005 12:26 PM
To: CESAJ-CC, PublicMail SAJ
Subject: Brevard County Shore Protection Project

To Whom It May Concern,

I am completely against ANY type of shore protection projects related to the Brevard County Shore Protection Project. However, I am all for the new initiative on Planned Retreat and strongly feel that now is the time to put a complete moratorium on all new construction east of state road A-1-A. It is th man-made structures which are impeding the natural process of beach stabilization. Undeveloped portions of the south beaches with native habitat where barely phased by last year's hurricane erosio

I have lived on the beach in south Brevard county since 1969 and have witnessed both the natural and man-made changes to our coast line first hand. The beach in front of my house was one of the staging areas for last year's so-called "Beach Renurishment" projects where they dumped countless truck loac of so-called beach quality sand on the dune line. During the past year since this project, almost the entire rebuilt dune line has completed eroded and has finally reverted back to the original beach and dune grade.

There have been several obvious and serious destructive consequences as a result of this project whic I have observed on a daily basis. The first and most serious problem is the destruction of Sea Turtle nesting habitat.
This year close to 50% of the turtles which did attempt to lay their eggs simply returned to the ocean without laying their eggs. I walked the beach for several miles after the last storm erosion event and observed several nests exposed in the newly dumped sand which had both undeveloped eggs and many dead baby turtles entombed between the nest and the surface of the sand. They appeared unable to d through the marl of this supposed beach quality sand. The second problem I have observed is the complete disappearance of sand crabs. Before the project there were crabs everywhere. However, sin the project I have not seen a single one. You must realize that the beach and sand dunes are a habitat of their own and not just a big sterile sand box. Since the last major erosion event, the new sand has finally mixed with the natural sand and the sand fleas and other small creature living in the surf line have begun to recover. Not only has this brought an influx of sea birds back, but also returned the texture and beauty of the beach back to a more natural state. The third problem is the obvious change of the off-shore sand bars (or lack there of). Since these sand projects where completed last year, we no longer have sand bar build up like have occurred since I have lived here. Even at the lowest tide, the sand bars rarely reach less the 4 feet in depth. I remember these generally occurring at several inche in depth. This may seem trivial but this does affect sea live and feeding patterns and also has seriously affect water sports as well. Finally, this project has minimally protected man-made structure for less than a year. Is the money spent worth such a short term solution?

Sincerely,
David Finley

Foley, Cindy T SAJ

From: Gibson, Terry [Terry.Gibson@Primedia.com]
Sent: Friday, October 07, 2005 4:02 PM
To: 'truman.scarborough@brevardcounty.us'; CESAJ-CC, PublicMail SAJ
Cc: 'r.pritchard@brevardcounty.us'; 'helen.voltz@brevardcounty.us'; 'sue.carlson@brevardcounty.us'; 'jackie.colon@brevardcounty.us'
Subject: public comments re Mid-Reach beach project

Attachments: FS comments.doc; 2005 Bioscience Beach nourishment.pdf


FS comments.doc (43 KB)


2005 Bioscience Beach nourish...

Dear Commissioners;

At the behest of Brevard County readers and advertisers, we have been watching closely all activities related to this proposed beach project. It is our duty as journalists to protect the democratic process, and it is our duty as watermen to protect Florida's priceless natural resources. Our comments were submitted both electronically and in a hard copy to the Corps before the deadline today. If you care to discuss the letter with me or any other staff, we will be finished with our TV filming season (we hope) and all back in the office by the week of Oct. 24. We strongly recommend that you take the letter under advisement, and rethink Mid Reach. Please see attached. I have also attached a peer-reviewed article that just appeared in Bioscience that underscores our concerns. These comments and the journal article have also been sent to Senator Nelson and Representative Weldon.

Sincerely;

Terry Gibson
Managing Editor
Shallow Water Angler Magazine <<FS comments.doc>> <<2005 Bioscience Beach nourishment.pdf>>
Assistant Editor Florida Sportsman Magazine 772-219-7400 ext. 101
cell: 561-312-7532
email: terry.gibson@primedia.com

SURFERMAG.COM ONLINE EXCLUSIVE

Is Florida's "Beach Re-nourishment" Killing the Beaches?

An interview with *Florida Sportsman* editor Terry Gibson

by

Chris Dixon

One World Correspondent - SurferMag.com

SURFERMAG.COM: Terry, recently your magazine, Florida Sportsman, the largest regional fishing mag in the country, devoted a whole three-part series to the issue of "beach re-nourishment." Why did your staff consider this so important?

Dean Randazzo down south.
Frock

TERRY GIBSON: Keep in mind that most of our staff and contributors do some combination of fishing, surfing and diving. Most of our field editors and everyone on the staff has watched, disgusted, as these massive dredge-and-fill projects do serious and sometimes irreparable harm to our beaches, surf breaks and reefs. And we get letters to the editor about it all the time from around the state. But we weren't sure how to handle something as complicated as Florida beach management issues in one story. Then came the 2004 hurricanes. The buzzards from the American and Florida Shore and Beach Preservation Associations [ASBPA/FSBPA] flew to Washington, D.C., and lobbied Congress for almost $200 million and bragged about their plans to "re-nourish beaches that aren't even eroded yet." Keep in mind that those organizations are composed of vested interests -- they're lobbyists, dredgers, consultants and agency personnel that stand to benefit tremendously by perpetual beach-building. In the ensuing panic, the [Army] Corps [of Engineers] and Florida Department of Environmental Protection [DEP] and other agencies authorized all kinds of emergency permits, and brought the dredges in before anyone but a handful of scientists could say, "Hold on, the system can't take all this dredging and filling at once." When we realized that 40 percent of Florida's beaches are deemed "eroded" enough to warrant a "nourishment," we realized that nothing less than the future of Florida's fisheries were at stake. So we decided to devote as much real estate as we could to the issue. We could have filled three issues writing on the subject.

SURFERMAG.COM: What's so bad about pumping sand back onto a beach after a hurricane?

TERRY GIBSON: First off, erosion isn't a problem for beaches, just for buildings. And in most cases, the sediment they're dredging up is clustered mud, and/or fossil fragments, not sand. Several of Florida's top geologists are bothered that the Corps and the dredge lobby call this stuff "sand," much less these massive dredge-and-fill projects "nourishments." The geologists demonstrated how this stuff doesn't behave anything like native beach sand once placed in the intertidal zone. This stuff has been sitting out there for 5,000 to 7,000 years in a low-energy environment while algae and microorganisms bored into the grains and hollowed them out. Plus, the slurry is full of fine sediments, and the shell fragments that are too light and fragile to stay on the beach or intact in the high-energy surf zone. The waves slam the fragments into each other; they break apart and wash away to scour reefs when present, choke filter-feeding beach invertebrates, and stress fish gills. The stuff is so light that "nourished" beaches erode two to 12 times faster than native beaches. Plus, turbidity levels that exceed Clean Water Act regulations have been recorded months or even years after a project.

SURFERMAG.COM: I lived in West Palm Beach several years ago. I remember when they pumped the stuff onto the beaches at Juno. The sandbars were all screwed up for surfing and the water was all milky from the stuff they pumped onshore.

TERRY GIBSON: That was one of the worst projects in history. Five years later, the water is still milky. It took two hurricanes to fix the sandbars, and the fishing has never recovered. They're about to bury Phipps Reef next, even though the mitigation reef is covered and the Lake Worth Pier is just a couple of miles of beach. Hell, it's happening all over the state.

SURFERMAG.COM: I'm just going to go through some of what I read in your three-part series and get you to elaborate or make points. To begin with, you go a bit into history and discuss how in the 1970s the Army Corps of Engineers began looking at so-called "beach re-nourishment" as an option to seawalls or shoreline armoring.

TERRY GIBSON: It took half a century for geological societies and environmental groups to get the Corps to consider anything but armoring for "shoreline protection." Once the Corps got in the beach-building business, they realized it was a way to fund themselves and their operations perpetually, and so have ignored or understated the environmental impacts associated with these massive dredge-and-fill projects.

SURFERMAG.COM: I found it interesting that you wrote that it had just always been assumed that in areas where the dredge material comes from, that bottom-dwelling animals just soon come back.

TERRY GIBSON: But there is no real science to say whether or not this was true. Here are agencies and proponents claiming there is no real lasting harm, without a single study -- at least any I could find in the course of three years of research -- that meets standards of scientific rigor. Essentially, they're strip-mining the continental shelf, and saying there are no long-term impacts. A lot of the organisms they're dredging up, benthic Sargassum, grasses and a variety of mollusks, for example, are the staples for sea turtles.

SURFERMAG.COM: But don't sea turtles and shorebirds benefit from so-called "beach nourishment" because they end up with beaches to live on?

TERRY GIBSON: Berm-building is better for turtles and shorebirds than seawalls, but these fake beaches erode so swiftly they leave steep drop-offs called "escarpments" that are awful tough for turtles to climb. These beaches are so wide the nesting females often can't find the dune line, which triggers the digging instinct. So they make "false crawls," or nest so low the eggs are washed away as the weak sediments erode. The dark color of the sediment creates another serious issue. Nest temperature determines turtle sex, so the dark sediment heats up the nests and a disproportionate number of females are hatched. And those that do hatch have a longer gauntlet to crawl than they would on a native beach. As for shorebirds, they feed on beach invertebrates such as sand fleas, the populations of which are usually decimated for relatively long intervals when applied to time spans relevant to animals. Again, sea life has no problem with narrow, high-energy beaches. The most productive sea turtle nesting beaches in the world, Archie Carr Refuge and Playa Tortuguero, Costa Rica, are narrow, high-energy beaches. Most of the beaches they're dredging and filling are ample enough to support fish, birds, turtles, and surfers.

SURFERMAG.COM: Are there really a lot of living reefs offshore in Florida, or a lot of other habitats? I think most people just sort of assume it's either dead already or that offshore is just a big underwater sandy wasteland.

TERRY GIBSON: Our coral reefs are hurting, but we still have thriving colonies. A lot of the hard bottom that doesn't look like much, for example the reefs you used to find in Juno Beach, or at Stuart Rocks for example, aren't coralline but still provide essential habitat to 537 marine species, including 320 animals. In fact, NOAA designated nearshore hard bottom as essential fish habitat and habitat areas of particular concern because they're so phenomenally important to post-larval reef fish, including snappers and grunts.

SURFERMAG.COM: What about game fish?

TERRY GIBSON: Well, you can't have a healthy biomass of apex predators unless you have healthy habitat, including abundant food sources. These projects have impacted in various ways fishing for snook, pompano, permit, bonefish, whiting, red drum, croaker, several snappers, tarpon, flounder, really everything you catch in the near-shore environment. What's scary is that no one talks about these projects in terms of cumulative impacts -- I mean more than 100 of them have occurred and there are dozens in the works at any time. And no one factors their impacts combined with other stressors, such as red tides or storm water discharges.

SURFERMAG.COM: You wrote that some $200 million in State and Federal dollars would be spent this year alone to dredge and fill beaches in Florida. That would bring the historic total to something like a billion dollars that mostly comes from taxes.

TERRY GIBSON: Pretty close. The dredge lobby claims it's worth it because beaches are such enormous economic engines. In some cases, dredging and filling a beach is the best option. But the only thing that benefits from these big, square, mud beaches are buildings and tourist traps. But not for very long. These beaches rarely survive more than one or two winters. And the dredge lobby doesn't want to talk about how these projects discriminate against the most consistent beach-goers and ocean users, anglers, surfers and divers, even though fishing, surfing and diving each are multi-billion-dollar industries in Florida. Yet they don't count us in their economic surveys. You can fish in a bucket and you'd have about the same chance of catching something as you would fishing along most re-nourished beaches. Eventually you'll get tired of it and quit fishing. You can dive in a murky lake, but you won't keep spending thousands to do it. And you can surf a close-out shorepound, but eventually you'll get sick of dinging yourself and your board. Florida's coastal management system has disenfranchised those who love the coast the most, understand it, and know how to care for it best.

SURFERMAG.COM: Talk a little bit about who and what watermen are up against in getting anti-dredging messages across.

TERRY GIBSON: Well, first off, there's

Wes Laine digging into a sand bank.
Welsh/SurfNRG.com

the demand side. Generally it comes from condominium associations and waterfront home/business owners. They scream loud enough to get counties to hire slick lobbyists that spin these things as economic development, or environmental/recreational restorations, while they attack anyone that points out environmental impacts or questions the social/economic equity of the practice. Also, keep in mind that the Corps has a vested interest in perpetual beach-building; it spells endless Congressional budget appropriations for them. Unfortunately, they're the ultimate coastal permitting authority, and they beat up on us Fish and Wildlife or National Marine Fisheries biologists if they start to object. Legislators are either all too willing to spend your tax dollars for the transitory protection of a few buildings, or the lobbyists drown out the voices of independent scientists and the folks that have been wronged by these projects. It takes community involvement on the local level to force decision-makers to come up with locally preferred alternatives, and more industry involvement on the state and national levels would help tremendously. The most important thing is to educate the media about the real nature of this nasty beach business.

SURFERMAG.COM: The article series says that Florida beachfront property owners and the State seem "addicted" to sand pumping.

TERRY GIBSON: Yes, we are addicted to the tax revenues from high-density coastal development. These projects only perpetuate the addiction by encouraging growth in the stupidest, doomed places. And it gives oceanfront property owners a little kick, a false and very short-lived sense of security about living in the danger zone. Florida's coastal management policies have us on a collision course with disaster. If we don't employ more sustainable technologies while we find a fair way to implement managed retreat, the state will have only lifeless beaches and seawalls to offer.

SURFERMAG.COM: You pointed out that the vested interested make Florida's coastal management decisions.

TERRY GIBSON: The lobbyists, dredgers, the sundry contractors and government-employed sacred cows love Florida's coastal management policies. The State isn't looking at long-term solutions, at moving back the coastal construction line, at managed retreat, or even seriously at sand transfer plants and other more sustainable technologies. The dredge lobby, the shore and beach crowd, took the high-level coastal management positions and perpetuate lucrative contracts and secure government jobs for themselves indefinitely. As a result, agencies and individuals within agencies, especially the Florida DEP [Dept. of Environmental Protection], are operating in conflict of interests and at cross-purposes internally.

SURFERMAG.COM: There was a picture in one of your articles of the mucky spoil that was put up on the beaches in St. Lucie [County] from one of these projects.

TERRY GIBSON: I can't overstate the ecological value and sensitivity of that area. We're talking North America's most biologically diverse non-coralline reefs, just across a sliver of barrier island from the Indian River Lagoon, North America's most biologically diverse estuary. Last week we had some little waves and I slipped on that mud, which is now covering the reefs. The commercial pompano fishermen dropped the dime on the County, and DEP did investigate it. We had the University of Miami analyze the stuff in case DEP pulled a fast one. But the DEP analysis shows that the stuff doesn't meet standards. The question is: Will DEP press first-degree misdemeanor charges against St. Lucie engineer Richard Bouchard? He's on FSBPA's [Florida Shore and Beach Preservation Assoc.] board of directors, so we doubt it. It's a real shame. There's probably lots of high-quality real sand that can be mined inland and used on

beaches that badly need it. Martin County engineer Kathy Fitzpatrick did a yeoman's job after the storms, with trucked-in sand down at Stuart Rocks and Bathtub Beach. She monitored the sand coming off every single dump truck that came in. More than 40,000 trucks. Something had to be done. The beach was scraped down to the limestone mantle. She showed us that beach replenishment can truly be an environmental restoration. The sand is almost exactly what was on the beach naturally, the surf isn't screwed up, and there wasn't any lasting turbidity from the work. We doubt Bouchard ever went down to see what was going on his beach.

SURFERMAG.COM: What's this about transplanting corals in Fort Lauderdale?

TERRY GIBSON: There were patches of staghorn and other corals that stood in the way of the Corps and "shoreline protection." You can transplant corals easily enough, but apparently the contractors botched the job repeatedly. The corals are dead or dying. Can you imagine in California if someone had an idea to replace the sand at Pleasure Point and said, "Umm, We want to take up all the kelp reef offshore in Santa Cruz so we can pump some more sand onto the beach here at Pleasure Point -- which is eroding. We'll put the reef back down though -- just somewhere else, and we promise the kelp won't die. Oh, and don't worry about the fact that there won't be any otters or kelp offshore from Santa Cruz now. They'll be thriving off, say, Ocean Beach." They'd be laughed out of the Coastal Commission and sent back to Florida.

SURFERMAG.COM: So what do you do from here?

TERRY GIBSON: We don't have all the answers, nor do we claim to. But legislators need to start by taking an honest look at these so-called re-nourishment projects. We must establish a review process for these projects that is based on sound economics and hard science and fair public involvement, i.e. prior outreach to watermen. How long will this re-nourished sand last? What's it going to cost in plus losses felt by watermen -- divers, surfers and fishermen? Can it be justified in terms of losses to reefs, turtles, and fish? We've got to get away from this mindset that a sandy coastline is somehow permanent, and recognize the fact that the phrase "dune line" is a paradox. I submit we need to be willing to live with narrower beaches. We need sand transfer plants like the one at the Palm Beach Inlet, or better yet, the one at the Superbank in Australia, at the major inlets. Those artificial reefs designed to break up wave energy farther offshore seem worth a few more tries. And we need a fair, managed retreat program. Other states, including Maine, North Carolina and California, have them. If we don't hurry up, we'll only have lifeless beaches and seawalls.

Assessing the Environmental Impacts of Beach Nourishment

CHARLES H. PETERSON AND MELANIE J. BISHOP

With sea levels rising under global warming, dredge-and-fill programs are increasingly employed to protect coastal development from shoreline erosion. Such beach "nourishment" can bury shallow reefs and degrade other beach habitats, depressing nesting in sea turtles and reducing the densities of invertebrate prey for shorebirds, surf fishes, and crabs. Despite decades of agency-mandated monitoring at great expense, much uncertainty about the biological impacts of beach nourishment nonetheless exists. A review of 46 beach monitoring studies shows that (a) only 11 percent of the studies controlled for both natural spatial and temporal variation in their analyses, (b) 56 percent reached conclusions that were not adequately supported, and (c) 49 percent failed to meet publication standards for citation and synthesis of related work. Monitoring is typically conducted through project promoters, with no independent peer review, and the permitting agencies exhibit inadequate expertise to review biostatistical designs. Monitoring results are rarely used to scale mitigation to compensate for injured resources. Reform of agency practices is urgently needed as the risk of cumulative impacts grows.

Keywords: beach nourishment, biological impacts, monitoring, public trust, sampling design

Beaches are in a constant state of flux, accreting and eroding in response to waves, currents, winds, storms, and sea-level change. As a consequence, development along ocean shorelines entails substantial risk of property loss. In recognition of the vulnerability of coastal development to shoreline erosion and flooding, and in response to the value of fish and wildlife habitat, the US Congress passed the Coastal Barrier Resources Act in 1982 to discourage overdevelopment of largely undeveloped coastal barriers along the Atlantic and Gulf coasts (Wells and Peterson 1986). Under incentives from the federal Coastal Zone Management Act, individual states have also developed coastal management programs that establish setbacks and impose other restrictions on development along ocean beaches. Nevertheless, development on coastal barriers has burgeoned dramatically.

As escalating rates of global warming lead to more rapid rise in sea level and greater frequency and intensity of storms, demand for engineered solutions to shoreline erosion is intensifying (Barth and Titus 1984). Massive dredge-and-fill projects have become a common method of combating shoreline retreat. Between 1922 and 2003, beginning with the first beach nourishment at Coney Island, New York, at least 970 projects have "nourished" more than 6050 kilometers (km) of US shoreline along the Atlantic and Gulf coasts, using 430 million cubic meters (m^3) of fill (*www.nicholas.duke.edu/psds/nourishment.htm*). During nourishment, sediments from a dredge site or terrestrial source are added to the beach to elevate it and extend it seaward. Unlike seawalls and groins that act only to harden the shoreline or redistribute sediment, nourishment temporarily adds sediment to the beach system (Bush et al. 2004). State resource agencies' preference for beach nourishment to combat shoreline retreat is motivated by a well-founded desire to avoid the negative impacts of hardened structures on the recreational and biological habitat values of ocean beaches; however, any presumption that nourishment projects are ecologically benign is derived from an incomplete and flawed body of science.

The sand beach represents a productive and unique habitat supporting the seasonal nesting of threatened and endangered sea turtles and dense concentrations of benthic invertebrates that feed surf fishes, resident and migrating shorebirds, and crabs (Brown and McLachlan 1990). The beach and nearshore coastal habitats are substantially disturbed by and can be functionally degraded through the process of nourishment. Permits for beach nourishment projects in the United States have routinely required monitoring of biological resources on the beach and at the dredging site. Despite decades of monitoring and scores of reports (reviewed by Nelson 1993), much uncertainty persists about the ecological impacts of nourishment and how to minimize and mitigate them. Here we conduct a synthesis of the

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sampling designs, statistical analyses, and bases for interpretations across 46 studies done to assess the ecological impacts of beach nourishment. Using this synthesis, and an overview of agency practices in permitting beach nourishment, we help to explain why so much effort at such high cost has led to so little progress toward understanding and predicting ecological impacts, and we suggest some remedies.

Methods of assessing study designs

We searched for all available reports, publications, and theses evaluating biological impacts of beach nourishment. The search, which was restricted to the United States so as to include only studies affected by the same federal framework of environmental policy, was facilitated by Nelson's (1993) identification of early unpublished reports, the category that still constitutes the large majority of this literature. Assuming that the peer-reviewed, university-examined, and more widely cited gray literature tends to be of higher quality than unpublished reports that are only locally available and not readily accessible, the statistics based on our sample most likely understate the frequencies of study deficiencies. Each of us independently reviewed every study and answered the same set of questions about its subject matter and the scientific basis for its conclusions. The few (< 5 percent) disagreements between our findings proved to be caused by misinterpretation, which was resolved by reexamining the documents. Where the same study was produced in multiple forms (e.g., as an unpublished report and as a refereed paper), we considered only the most critically reviewed version.

Studies were characterized by decade of initiation, type (gray literature report, thesis, or published paper), process of interest (dredging or filling), geographic location, target biota (soft-bottom or hard-bottom macroinvertebrates, fish, sea turtles, or shorebirds), and approach (observational monitoring, controlled experimentation, or modeling). For each type of target biota, we computed how frequently each of a series of physical habitat variables and potential biological responses was assessed. Finally, we evaluated the sampling designs, statistical analyses, and bases for interpretations and conclusions in each of the studies by applying fundamental principles of statistical inference (as exemplified by Schmitt and Osenberg 1996 and Underwood 1997) to answer a series of questions (see box 1). The standard applied to the last question on scholarship was that of *Marine Ecology Progress Series*, an international journal appropriate for the topic and for which one of us (C. H. P.) has served as editor for two decades.

Characterization of studies

Our sample of available studies (table 1) was dominated by unpublished reports (59 percent). Although anonymous scientific peer review has been widely endorsed as the most reliable means of ensuring rigor (NRC 2000), this process is not applied to environmental monitoring proposals or final reports that are mandated by permitting agencies on behalf of public trust resources. Our review illustrates a tendency of temporally increasing publication of the impact assessment studies from the 1970s, when they first appeared (7 percent published in peer-reviewed journals), to the 1990s (33 percent). These absolute percentages are most likely biased upward because gray-literature reports of limited circulation are more difficult to find and therefore underrepresented in our review.

Of the 46 studies assessed, 83 percent were conducted along the Atlantic coast and 13 percent along the Gulf coast of the United States. Most came from Florida (29 studies), reflecting a concentration of nourishment projects along its 200-km southeastern coast, where at least 50 million m^3 of sediment were deposited on beaches between 1960 and 2000 (Bush et al. 2004). Other states represented are North Carolina (9 studies), South Carolina (4), New Jersey (2), California (1), and Michigan (1).

Benthic invertebrates were the most frequently targeted organisms (78 percent of all studies), reflecting their suitability as ecological indicators. Benthic invertebrates are relatively sessile (therefore allowing spatial patterns to imply causation), can be sampled quantitatively without high cost, are well described taxonomically, and reveal ecologically meaningful and important patterns, even at coarse levels of taxonomic discrimination (Warwick 1988). Few assessments of beach nourishment have considered its impacts on demersal fishes (33 percent), and even fewer have considered impacts on shorebirds (4 percent), although both these groups of organisms have value to humans and provide ecosystem services.

Only one assessment (Manning 2003) employed experimental manipulations, widely acknowledged as the most rigorous means of inferring causation in ecology (Paine 1977), and none employed modeling (tables 2, 3), the most widely accepted tool for evaluating the dynamics of fish populations (Hilborn and Walters 1992). Thus, two of the most powerful scientific tools are routinely overlooked in favor of purely observational monitoring. Monitoring can be a seriously flawed means of testing impacts, because of uncontrolled, confounded factors that often taint inferences (see Connell's 1974 discussion of "natural experiments"). Inferences reached by comparing results of separate monitoring studies are particularly tenuous, because in none of these contrasts does only a single factor differ among studies.

The physical habitat and biological response variables commonly monitored in beach nourishment projects (tables 2, 3) include many of relevance. Among those that monitored habitat condition, varying percentages of studies measured turbidity; mean grain size; sediment grain-size distribution; surface cover by hard substrata (shells, limestone, etc.); sediment mineralogy, organic content, and compaction; surface topography; and habitat damage from gear contact. The biological responses assessed included total abundance of the entire biotic assemblage, abundance of component taxa, total biomass, biomass of selected taxa, size–frequency distribution of selected taxa, various species diversity indices, community composition, and some measure of physiological status of an important species (table 4). Nevertheless,

Table 1. Characterization of 46 studies monitoring ecological impacts of beach nourishment.

Authors	Date of document	Decade of initiation	Type	Process	Coast (state)	Target biota[a]	Study type
Blair SM, Flynn BS, Markley S	1990	1980s	Paper (nonrefereed)	Dredge	Atlantic (FL)	Macroinvertebrates (hard)	O
Blair S, Flynn B, McIntosh T, Hefty L	1990	1990s	Report (final)	Dredge	Atlantic (FL)	Macroinvertebrates (hard)	O
Bowen PR, Marsh GA	1988	1970s	Report (final)	Dredge	Atlantic (FL)	Macroinvertebrates (soft)	O
Broadwell AL	1991	1980s	Master's thesis	Fill	Atlantic (FL)	Sea turtles	O
Burlas M, Ray G, Clarke D	2001	1990s	Report (final)	Both	Atlantic (NJ)	Fish, macroinvertebrates (soft)	O
Charvat DI	1987	1980s	Master's thesis	Fill	Atlantic (FL)	Macroinvertebrates (soft)	O
Coastal Science Associates Inc	2002	2000s	Report (interim)	Both	Atlantic (NC)	Fish, macroinvertebrates (soft)	O
Courtenay WR Jr, Hartig BC, Loisel GR	1980	1970s	Report (final)	Dredge	Atlantic (FL)	Fish	O
Culter JK, Mahadevan S	1982	1970s	Report (final)	Both	Gulf (FL)	Macroinvertebrates (soft)	O
Davis RA Jr, FizGerald MV, Terry J	1999	1990s	Paper (refereed)	Fill	Atlantic (FL)	Sea turtles	O
Deis DR, Spring KD, Hart AD	1992	1980s	Report (final)	Both	Gulf (FL)	Macroinvertebrates (soft)	O
Dodge RE, Hess S, Messing C	1991	1980s	Paper (nonrefereed)	Both	Atlantic (FL)	Macroinvertebrates (soft, hard)	O
Donoghue CR	1999	1990s	PhD thesis	Fill	Atlantic (NC)	Macroinvertebrates (soft)	O
Fisher LE, Dodge RE, Messing CG, Goldberg WM, Hess S	1992	1990s	Paper (nonrefereed)	Both	Atlantic (FL)	Macroinvertebrates (soft, hard)	O
Goldberg WM	1985	1980s	Report (final)	Both	Atlantic (FL)	Macroinvertebrates (soft, hard)	O
Gorzelany JF, Nelson WG	1983	1980s	Paper (refereed)	Fill	Atlantic (FL)	Macroinvertebrates (soft)	O
Hayden B, Dolan R	1974	1970s	Paper (refereed)	Fill	Atlantic (FL)	Macroinvertebrates (soft)	O
Holland HT, Chambers JR, Blackman RR	1986	1970s	Report (final)	Both	Gulf (FL)	Fish	O
Johnson RO, Nelson WG	1985	1980s	Paper (refereed)	Dredge	Atlantic (FL)	Macroinvertebrates (soft)	O
Jutte PC, Van Dolah RF, Levisen MV	1999	1990s	Report (final)	Dredge	Atlantic (SC)	Macroinvertebrates (soft)	O
Jutte PC, Van Dolah RF, Levisen MV	1999	1990s	Report (final)	Fill	Atlantic (SC)	Macroinvertebrates (soft)	O
Lindeman KC, Snyder DB	1999	1990s	Paper (refereed)	Fill	Atlantic (FL)	Fish	O
Manning LM	2003	1990s	PhD thesis	Fill	Atlantic (NC)	Fish, macroinvertebrates (soft)	O, E
Marsh GA, Bowen PR, Deis DR, Turbeville DB, Courtenay WR Jr	1980	1970s	Report (final)	Fill	Atlantic (FL)	Macroinvertebrates (soft, hard)	O
Nelson WG, Collins G	1987	1980s	Report (final)	Fill	Atlantic (FL)	Fish, macroinvertebrates (soft)	O
Nelson DA, Mauck K, Fletemeyer J	1987	1980s	Report (final)	Fill	Atlantic (FL)	Sea turtles	O
Nester RT, Poe TP	1982	1980s	Report (final)	Fill	Great Lakes (MI)	Fish, macroinvertebrates (soft)	O
Parr T, Diener D, Lacy S	1978	1970s	Report (final)	Fill	Pacific (CA)	Macroinvertebrates (soft)	O
Peterson CH, Hickerson DHM, Johnson GG	2000	1990s	Paper (refereed)	Fill	Atlantic (NC)	Macroinvertebrates (soft)	O
Posey M, Alphin T	2002	1990s	Paper (refereed)	Dredge	Atlantic (NC)	Macroinvertebrates (soft, hard)	O
Putt RE, Spring KD, Graham BD, Deis DR, Walensky RE, Rudolph HD	1984	1980s	Report (final)	Both	Atlantic (FL)	Macroinvertebrates (soft, hard)	O
Rackocinski CF, Heard RW, LeCroy SE, McLelland JA, Simons T,	1996	1980s	Paper (refereed)	Fill	Gulf (FL)	Macroinvertebrates (soft)	O
Raymond PW	1984	1980s	Master's thesis	Fill	Atlantic (FL)	Sea turtles	O
Raymond B, Antonius A	1977	1970s	Report (final)	Dredge	Atlantic (FL)	Macroinvertebrates (hard)	O
Reilly F Jr, Bellis VJ	1983	1970s	Report (final)	Fill	Atlantic (NC)	Fish, macroinvertebrates (soft)	O
Rumbold DG, Davis PW, Perretta C	2001	1990s	Paper (refereed)	Fill	Atlantic (FL)	Sea turtles	O
Ryder CE	1993	1990s	Master's thesis	Fill	Atlantic (FL)	Sea turtles	O
Salomon CH, Naughton SP, Taylor JL	1982	1970s	Report (final)	Dredge	Gulf (FL)	Macroinvertebrates (soft)	O
Salomon CH, Naughton SP	1984	1970s	Report (final)	Dredge	Gulf (FL)	Macroinvertebrates (soft)	O

(*continued*)

(Table 1, continued)

Authors	Date of document	Decade of initiation	Type	Process	Coast (state)	Target biota[a]	Study type
Spadoni RH, Campbell TJ	1981	1970s	Report (final)	Dredge	Atlantic (FL)	Fish, macroinvertebrates (soft)	C
Turbeville DB, Marsn GA	1982	1970s	Report (final)	Dredge	Atlantic (FL)	Macroinvertebrates (soft)	O
Van Dolah RF, Wendt PH, Martore RM, Levisen MV, Roumillat WA	1992	1990s	Report (final)	Both	Atlantic (SC)	Fish, macroinvertebrates (soft)	O
Van Dolah RF, Martore RM, Lynch AE, Wendt PH, Levisen MV, Whitaker DJ, Anderson WD	1994	1990s	Report (final)	Both	Atlantic (SC)	Fish, macroinvertebrates (soft)	O
Versar Inc.	2003	2000s	Report (final)	Fill	Atlantic (NC)	Fish, macroinvertebrates (soft), shorebirds	O
Versar Inc.	2004	2000s	Proposal	Both	Atlantic (NC)	Fish, macroinvertebrates (soft), shorebirds	O
Wilber DH, Clarke DG, Ray GL, Burlas M	2003	1990s	Paper (refereed)	Fill	Atlantic (NJ)	Fish	O

E, experimental study with controlled manipulations; O, observational monitoring.
a. "Soft" or "hard" refers to whether the bottom organisms assessed occurred on sediment (soft) or limestone reef (hard) bottom.

disturbingly high percentages of assessment studies (25 to 38 percent for dredging and 17 to 80 percent for filling) failed to measure any habitat variable (tables 2, 3). Despite the need for dredging contractors to monitor topography as a permit condition and as a measure of performance, this important habitat characterization was not routinely reported in the impact assessment documents. Its complete omission from dredge sites (table 2) is especially critical because creation of deeper pits induces fine sedimentation, which can inhibit recovery of the natural benthic invertebrate community for years (Rakocinski et al. 1996).

Although studies frequently measured relevant aspects of physical habitat condition, only sedimentation rate, out of many potentially important physical processes, was estimated with any appreciable frequency (tables 2, 3). Sediment transport, erosion of fine sediments off the beach face, dynamics of turbidity plumes, concentration of large shells, and other physical processes likely to influence the biota and affect recovery went without evaluation in any impact study. Few studies measured changes in body size within species, which can indicate mode of recolonization (larval transport and settlement versus migration of older stages; table 4). Measurements of biological processes such as burrowing and predation rates have been reported from only one study (Manning 2003) and recruitment rate from one other (Lindeman and Snyder 1999). Gut contents of fish were only occasionally measured as an indication of feeding success (included in physiological status; table 4). Despite the scientifically compelling advice of Nelson (1993) to avoid use and risky interpretation of diversity indices, this practice is still common in beach nourishment studies (table 4) and still without rigorous conceptual support (Hurlbert 1971). When the simple, more readily interpretable species richness is measured (matching current usage in basic ecology), the necessary adjustments for statistical dependency on abundance (Hurlbert 1971) are missing.

Sampling design

Our synthesis of sampling designs reveals numerous inadequacies that seriously compromise the studies' results and conclusions (box 1). Researchers engaged in field sampling to estimate biotic abundances usually used appropriate devices, but the 39 percent incidence of failure to employ the least biased gear would be viewed as unacceptably high for any scientific granting agency. The most frequent violation came from the use of grab samplers instead of cores to sample soft-sediment invertebrates. This results in failure to sample to the full depth of occupation of the sediment column. Furthermore, those sedimentary strata that are included in a grab sample are not sampled equally (in contrast to a core, which projects its surface area downward), making it impossible to estimate density accurately. Grab samples also include varying amounts of sediments per sample, depending on bottom hardness and on obstructions such as shells.

A serious shortcoming in the sampling designs of most studies was the failure to consider both natural spatial variation and natural temporal variation on multiple scales so as

to craft a sampling design that minimized unexplained error variance and prevented confounding of sources of variation (Green 1979, Underwood 1997). Although 26 percent of the studies included sampling in a spatially nested and 30 percent in a temporally nested design, not one incorporated this information into a nested analysis so as to partition out scales of natural variability.

Few of the monitoring studies of beach nourishment employed a priori power analyses of any sort (9 of 46 contained inappropriate power analyses, and only 1 contained an appropriate analysis) to help determine how much replication was required to detect an effect of biologically meaningful magnitude. Only one study (Wilber et al. 2003) employed post hoc power analysis to quantify the magnitude of the effect that could be detected and thereby provide insight into how to interpret an absence of a statistically significant difference. This power analysis showed that the design could detect only threefold or greater differences in surf fish abundance, which obviously did not provide much resolution. A large fraction (62 percent) of past assessments of ecological impacts of beach nourishment possessed sampling designs without adequate power to detect effects of importance (defined as an ability to detect with 80 percent probability a decline of approximately 50 percent or an increase of approximately 100 percent).

Most, but not all, studies included sampling of control sites, but there was a relatively high incidence of potential violations of the basic principle of independent controls (box 1). Few beach nourishment studies followed the sound statistical advice (Hurlbert 1984) of interspersing treatments and controls to avoid spatial interdependence. This is due, in part, to the lack of replication of fill sites in most projects, because sediments are typically deposited along a continuous stretch of the shoreline (Nelson 1993). Despite the common practice of extracting sediments for nourishment from multiple dredge sites, interspersion of treatments and controls to determine the impacts of sediment mining is also rare. Where the lack of replication of disturbed sites prevents a fully interspersed design, bracketing of the disturbed site with controls on both sides is the next best option. This was done in 11 of 35 controlled studies examining the impacts of filling.

Table 2. Physical habitat variables most frequently measured in studies of the impacts of dredging practices as part of beach nourishment.

(percent)

Environmental variable	Macroinvertebrates: Soft bottom (n = 16)	Macroinvertebrates: Hard bottom (n = 8)	Fish (n = 6)
Turbidity	13	25	33
Sedimentation	13	50	0
Mean grain size	56	13	17
Sediment grain-size distribution	56	38	33
Surface cover by hard substrata	0	0	0
Sediment mineralogy	25	0	17
Organic content of sediment	44	13	33
Sediment compaction	0	0	0
Topography	0	0	0
Habitat damage from gear contact	0	25	0
No habitat variables measured	25	38	33

Often, however, the putative control site was located too near the fill site, so that impacts transported by physical along-shore processes probably modified the control at least at one end of the beach (Hayden and Dolan 1974). Absent a gradient design that spaces sites at varying distances away from the fill site, rigorously identifying when a putative control has been compromised and quantifying the spatial extent of impact is difficult or even impossible. A gradient design has been employed in only one assessment of fill impacts (Hayden and Dolan 1974). In some studies, sites that had been recently nourished were then used to represent controls for subsequent nourishment (Burlas et al. 2001). Such a design violates the concept of a control and should be avoided to prevent the bias of underestimation of impacts of nourishment.

The duration of monitoring in these studies was frequently insufficient to characterize the biota before nourishment or to demonstrate the duration of habitat and biological impacts afterward. Sampling before the disturbance occurs should be sufficient to characterize natural preexisting differences between treatment and control sites in physical habitat and biotic systems (Stewart-Oaten et al. 1986). Frequently, studies did not adequately anticipate the nourishment project, and permit-granting agencies failed to delay the project to allow initial biotic characterization during relevant productive seasons. Eighty-seven percent of monitoring studies, with

Table 3. Physical habitat variables most frequently measured in studies of the impacts of filling practices as part of beach nourishment.

(percent)

Environmental variable	Macroinvertebrates: Soft bottom (n = 27)	Macroinvertebrates: Hard bottom (n = 5)	Fish (n = 9)	Sea turtles (n = 6)	Shorebirds (n = 2)
Turbidity	33	0	44	0	0
Sedimentation	4	20	0	0	0
Mean grain size	59	20	11	17	100
Sediment grain-size distribution	52	20	22	33	0
Surface cover by hard substrata	7	0	22	0	100
Sediment mineralogy	26	0	0	0	0
Organic content of sediment	30	0	0	0	0
Sediment compaction	4	0	0	67	0
Topography	52	0	33	0	100
Habitat damage from gear contact	0	0	0	0	0
No habitat variables measured	11	80	22	17	0

Table 4. Biological response variables most frequently assessed in monitoring studies of beach nourishment.

(percent)

Biological response variable	Macroinvertebrates: Soft bottom (*n* = 32)	Macroinvertebrates: Hard bottom (*n* = 9)	Fish (*n* = 15)	Sea turtles (*n* = 6)	Shorebirds (*n* = 2)
Total abundance	88	78	87	17	100
Taxon-specific abundance	84	89	100	17	100
Total biomass	6	0	13	0	0
Taxon-specific biomass	6	0	27	0	0
Size-frequency distribution	6	11	40	0	0
Diversity index	78	22	60	0	0
Community composition	41	0	33	0	0
Physiological status	6	11	40	67	0

an average duration of 1.5 years, were terminated before recovery of the affected biological resource was demonstrated.

Statistical analyses

The statistical analyses done on the monitoring data to test for biological impacts suffer from critical flaws in the basic sampling design; from improper analyses that do not match the sampling design; from failure to fully explain, justify, and report on the analyses; and from unjustified interpretations (box 1). A disappointing 27 percent of the beach nourishment studies conducted no formal statistical tests of significance.

Many studies (70 percent of the 33 studies that employed formal statistical testing) failed to include all appropriate independent factors or did not test for significance of all the measured response variables. The most serious analytic deficiency was the almost universal failure (in 41 of 46 studies) to isolate estimates of impact from confounding contributions of natural spatial and temporal variation by using a BACI (before–after, control–impact) type of analysis (Green 1979, Stewart-Oaten et al. 1986). The tests for biological impacts generally used either a spatial contrast among control and disturbed sites or a temporal contrast across time at sites before and after dredging or filling. Use of only spatial contrasts requires that no natural spatial variation exists between control and disturbed sites, a generally flawed assumption, since the structure of macrobenthic assemblages varies according to the morphology of beaches at scales of tens to hundreds of meters (Barros et al. 2002). Using a temporal contrast to evaluate the impacts of nourishment requires the assumption that the response variable (typically organism density) would remain constant over time in the absence of any impact. This assumption is violated by benthic invertebrate populations, whose seasonal variation is quite dramatic on sandy beaches (Manning 2003). Even if season is controlled, interannual differences can be large, confounding the ability to use temporal contrasts to infer impacts. Interestingly, 50 percent of the studies of beach nourishment were designed with the potential for BACI-type analysis, yet failed to conduct this most appropriate and rigorous analysis of variance to reach conclusions unbiased by natural spatial and temporal change.

Despite the emergence of powerful methods of multivariate statistical analysis of community responses to perturbations (Clarke 1993), few studies of impacts of beach nourishment went beyond tests on separate taxa or totals of taxa. Those few studies that did conduct assessments of community response employed similarity indices to compare nourished and control biotas (typically restricted to the soft-sediment invertebrates). No study applied the gold standard of multivariate analysis, nonmetric multidimensional scaling (n-MDS), an ordination procedure that has been demonstrated to discriminate ecological patterns with far greater resolution than univariate responses (Clarke 1993). The software package for this analysis, PRIMER 5 (*www.pml.ac.uk/primer/*), also includes other routines that permit analysis of how well physical habitat variables explain biotic response patterns.

Most (84 percent) studies overlooked formal statistical analysis of how changes in a physical factor or process may have caused a biological response (box 1). This oversight is particularly important in the case of the benthic invertebrates, for which much basic biological research demonstrates that sedimentology can dictate community composition (Gray 1974). Often the physical factors are monitored by a consultant separate from the one who conducts the biological studies, thereby inhibiting coordinated sampling and joint analyses of sampling results. Partly as a consequence, no monitoring study of beach nourishment has critically assessed how mismatched sediments continue to serve as a press disturbance (Bender et al. 1984) after completion of the beach filling activity. (A "press disturbance" is one that continues to affect the biological system for some relatively long period of time, as contrasted with a "pulse disturbance," which is a discrete event.) Beach nourishment is universally considered a short-term pulse disturbance, inappropriately viewed as analogous to natural sediment movements during a major storm. Uncharacteristically coarse sediments can be expected to remain for years on intertidal beaches and to become concentrated by wave action in the biologically most important zone, the swash zone, where they can continue to modify natural invertebrate abundance and community composition for years. Enhancement of the fraction of fine sediment during beach nourishment also has the potential to represent a press disturbance long after filling is completed, as wave

energy over time erodes and exposes fill materials into which mud has been embedded and thereby continues to inject biologically deleterious turbidity into the surf zone. For both methodological and biological reasons, the biological impacts of elevating turbidity during and after beach nourishment are never properly assessed (Telesnicki and Goldberg 1995). The persistence of a veneer of sediments over a coral reef or hard-bottom habitat constitutes a press perturbation that can last at least as long as the typical 3- to 10-year interval between repeated nourishment projects (Lindeman and Snyder 1999).

Conclusions and interpretations

The conclusions of beach nourishment studies are often flawed by lack of compelling support from adequate evidence, analysis, or interpretation (box 1). In our sample, the authors of 73 percent of the studies misinterpreted at least some of their results. Few studies (22 percent) included attempts to interpret observed biological responses by appeal to mechanistic processes. The conclusions of 56 percent of studies lacked rigorous support from evidence and analysis, most often because the sampling design, the analyses, or both failed to control for both natural spatial and temporal variation. The failure to address the power of the study design also frequently led to unjustified conclusions of absence of impacts, when capacity to detect even large impacts was compromised by high natural variability and low replication. The scholarship of the science in these studies was poor. A large fraction (49 percent) of beach nourishment studies failed to do more than a superficial job of citing (0 to 10 citations) and synthesizing relevant scientific literature.

Agency practice and policy implications

Our review of studies of impacts of beach nourishment, mostly monitoring studies conducted as a condition for permits, reveals serious deficiencies. The widespread flaws in design, analysis, and interpretation help explain why so much uncertainty still persists over the ecological consequences of beach nourishment despite four decades of monitoring at substantial expense. Substandard biological monitoring of beach nourishment persists despite the publication of reviews that provide explicit guidelines for the variables that should be monitored and the spatial and temporal scales to consider (Nelson 1993, NRC 1995, Schmitt and Osenberg 1996, Greene 2002). Further detailed guidance required to produce a model study design to assess impacts of beach nourishment with rigor is implicit in our descriptions of study flaws (box 1).

Inadequate funding of basic process-oriented science in the beach ecosystem contributes to the prevailing high uncertainty involved in predicting biological impacts of beach nourishment projects. To extrapolate from the demonstration of any given nourishment project's impacts and make reliable predictions about future projects requires a basic understanding of the processes that drive the dynamics of the natural system at 1- to 10-km resolution, a typical length scale of nourishment. Although many monitoring studies are adequately funded for the narrow goal of assessing impacts, funding for interdisciplinary studies of fundamental processes in the natural beach system, such as coupled physical and biological consequences of relative sea-level rise, waves, currents, and storms, either has not been sufficient or has not been pursued by the basic science community. The US Army Corps of Engineers recently invested $8.6 million in an 8-year

Box 1. Frequency of flaws in sampling design, statistical analyses, and interpretations and conclusions of 46 studies monitoring biological impacts of beach nourishment.

Flaws in sampling design

- Failure to employ the least-biased device available: 39 percent
- Failure to incorporate both spatial and temporal variation: 48 percent
- No nested sampling of spatial patterns: 74 percent
- No nested sampling of temporal patterns: 70 percent
- Failure to consider full consequences of seasonal variation: 39 percent
- Lack of appropriate a priori power analyses: 98 percent
- Lack of appropriate post hoc power analyses: 98 percent[a]
- Inadequate power in design to detect large impacts: 62 percent[a]
- Absence of controls: 15 percent
- Controls not independent of treatment or each other: 36 percent[b]
- Insufficient duration of sampling to demonstrate recovery: 87 percent[a]

Flaws in statistical analyses

- Absence of formal statistical tests: 27 percent[a]
- Multiple factors confounded in tests: 70 percent[c]
- Absence of BACI (before–after, control–impact) analysis: 89 percent[a]
- No inclusion of multivariate testing of community composition: 67 percent[d]
- Failure to test linkages between physical habitat and biological responses: 84 percent[a]
- No testing to discriminate between a pulse and press disturbance: 100 percent[a]

Flaws in interpretations and conclusions

- Misinterpretation of statistical test results: 73 percent[c]
- Lack of credible mechanistic explanation for biological responses: 22 percent[a]
- Conclusions not properly supported by observations and statistical test results: 56 percent[a]
- Citation and synthesis of literature fails to meet minimal publication standards: 49 percent[a]

a. $n = 45$ studies that, at the time of review, included results.
b. $n = 39$ studies with controls.
c. $n = 33$ studies that did statistical tests.
d. $n = 39$ studies that sampled multiple species.

program monitoring the impacts of a New Jersey project (Burlas et al. 2001), a monitoring effort that, despite its cost, advanced basic understanding relatively little (Greene 2002). Funding at about twice this level and for the same duration could have created a model study of fundamental beach processes that would improve the generic capacity to predict impacts. Funding agencies for basic science and the scientists who apply for their research grants bear partial responsibility for this poverty of understanding. The National Science Foundation and NOAA (National Oceanic and Atmospheric Administration), through their coastal ocean programs, could provide targeted funding for physical–geological–biological process studies of beaches to enhance the necessary fundamental understanding that is now lacking. Such interdisciplinary studies, using observation, experimentation, and modeling of the nearshore ecosystem, also provide potential for incorporating the consequences of multiple stressors on a landscape scale and thereby approach the ideal of ecosystem-based management endorsed by the US Commission on Ocean Policy (US COP 2004). There is a need for more basic and holistic research on process as well as more rigor in project-specific impact analyses.

So why do the federal (US Army Corps of Engineers) and state permit-granting agencies that are responsible for carrying out the mandates of the National Environmental Policy Act (NEPA) fail to ensure prevailing standards of scientific rigor and thus to discharge their obligation to protect public trust resources? Partial answers to this critical question come from a consideration of the process by which the monitoring components of beach nourishment permits are developed. Neither the US Army Corps of Engineers nor the state permitting agency employs the anonymous scientific peer-review process that is central to insuring high standards of excellence in basic scientific research (NRC 2000). Unfortunately, the federal and state permit offices, in their approval of monitoring designs, do not demonstrate adequate expertise in the critical discipline of biostatistics to ensure that the studies meet high standards of scientific rigor. The absence of expert review and rereview in the approval process to achieve acceptable designs is made more serious by the recognition that the monitoring is typically designed and conducted by private contractors, usually associated with the proponents of the nourishment project, rather than by independent research organizations. Anonymous peer review is needed for environmental impact statements (EISs), environmental assessments (EAs), monitoring proposals, and final reports to induce consulting agencies to employ their expertise to elevate beach nourishment science to prevailing standards of scientific rigor. Towns, counties, and other local units of government cannot be expected to possess the technical expertise to ensure scientific and statistical analytic rigor in monitoring studies for beach nourishment: they trust the state and federal governments to perform that function, a trust that is misplaced.

Not only can environmental permitting agencies be criticized for failure to ensure that studies of environmental impacts of beach nourishment meet basic standards of rigor in science, but the justification for the permit decision and required monitoring can also be challenged on occasion. Permitting agencies often yield to political pressure for nourishment permits and justify allowing high or uncertain risks by arguing that the agency can improve future permit decisions by learning from monitoring this risky aspect of the project. Such an argument is disingenuous if there is insufficient biostatistical expertise on the agency's staff and no independent scientific peer-review process to guarantee the rigor needed to assess impacts effectively. Furthermore, if this were an honest motivation and not just a rationalization, then funding would be in order for directed research on whether the very aspect of the study that is under question is adequately tested. This would often involve funding well-designed experiments and population modeling to complement the monitoring.

The most important scientific challenge in meeting the obligations of NEPA is evaluating the potential cumulative impacts of multiple projects in the context of the growing impacts of other human activities on coastal ecosystems. With rising sea levels and enhanced storminess driving increased demand for beach nourishment and washing away the fill even faster, cumulative impact is a critical concern that is not adequately evaluated through the current process of simply attaching scientifically flawed monitoring requirements to individual permits. Not only must rigorous analysis of cumulative effects address the expanding scope of beach nourishment, but it must also include the consequences of multiple escalating stressors in this coastal zone. This is the essence of ecosystem-based management for coastal resources, an overarching recommendation of the US Commission on Ocean Policy (US COP 2004). Absent legitimate assessment of cumulative impacts, EISs and EAs done for beach nourishment projects will also continue to be chronically deficient (Lindeman 1997).

Federal and state permitting agencies also often allow the required assessment studies to evade evaluation of important and highly uncertain potential impacts on the grounds of intrinsic difficulty of monitoring. Impacts to fish populations fall in this category, because their mobility and high natural variation in space and time prevent direct or indirect impacts on population size from being detected by empirical sampling of any individual beach nourishment project. Full evaluation of potential impacts on fish populations would require population modeling based on rigorous observations of process, probably including experimental tests of mechanisms. Such modeling should be done on the relevant large spatial and long temporal scales that define population processes, an impossibility for empirical monitoring. No permit condition for beach nourishment has required such modeling, despite the central role that this approach plays in fisheries science, the great importance of surf zone and nearshore habitats to many valuable fish populations (Hackney et al. 1996), and the documented extreme damage that beach nourishment inflicts on invertebrate prey on beaches (Rakocinski et al. 1996,

Peterson et al. 2000) and on reef habitat (Lindeman and Snyder 1999). Consequently, beach nourishment threatens essential fish habitats to an undetermined degree.

Environmental monitoring requires explicit goals. Without a defensible goal, monitoring becomes a tax on those who are paying for the project, functioning merely to sustain employment in consulting companies. Monitoring of beach nourishment should have two goals: first, to answer open questions about environmental impacts, and second, to quantify injury to public trust resources so as to allow compensatory mitigation. If the rigor of the science assessing impacts of beach nourishment were elevated through changes in agency process and through improved basic understanding of beach processes, the first of these motivations could disappear over time as the critical questions about environmental impact are answered. The second motivation should persist, except that only rarely now is mitigation ever required for habitat degradation, and never for injury to living resources arising from beach nourishment. Habitat mitigations that are now applied (e.g., rock removals from beaches by heavy equipment) are generally ineffective and typically involve intense disturbances likely to cause even more biological injury. Because restoring the natural granulometry of beach sands after filling with incompatible sediments may be impossible and retaining natural sediments is of such great biological significance (Nelson 1993), monitoring sediment size composition would best be done during the project. Then ongoing application of fill that fails to meet strict compatibility standards could be halted, and coarse components could be sieved out or fine ones winnowed out before completing the project.

Permitting any, let alone unlimited, filling and bulldozing of beach habitat without providing effective mitigation is inconsistent with regulatory treatment of other important habitats, such as salt marshes, seagrass beds, and coral reefs. NOAA requires compensatory mitigation for loss of ecosystem services to be funded by the party responsible for damage in other coastal habitats (Fonseca et al. 2000), a requirement somehow forgotten when beach ecosystem services are lost through nourishment. Restoring each injured species may not be feasible, and may require indirect measures such as protection of shorebird nests. However, some restorations could be achieved using aquaculture methods to reseed nourished beaches with lab-raised bivalves and those amphipods that lack pelagic dispersal to aid recolonization.

We suggest one solution to the challenge of how to make fundamental changes in the permitting process at federal and state levels so as to ensure compliance with NEPA and protection of public trust resources. The piecemeal project-by-project approach to assessing impacts and (rarely) providing mitigation for impacts should be replaced by a centralized program analogous to the wetland mitigation banking programs present in many states. Appropriate levels of monitoring and mitigation charges could be assessed to each project and paid into a single fund. The money could be used to fund research proposals addressing impacts of beach nourishment that are reviewed by qualified biostatistical and interdisciplinary scientific experts. Funded studies could include modeling at appropriately broad spatial and temporal scales to assess cumulative impacts and to evaluate fish population impacts. Studies could also involve experimental and observational tests of coupled physical–biological processes critical to understanding, modeling, and predicting biological impacts of beach nourishment.

Our review demonstrates that much uncertainty surrounding biological impacts of beach nourishments can be attributed to the poor quality of monitoring studies. Because neither federal and state permit-granting agencies nor consulting companies ensure sufficient rigor in beach monitoring done as a permit condition, and because the agencies rarely require compensatory mitigation of even egregious injuries, the required monitoring now serves little public purpose. Enhancing understanding of the impacts of beach nourishment consequently requires changes in agency process so that (a) monitoring studies are designed by adequately qualified scientists and required to meet prevailing standards of scientific rigor, (b) studies have clear goals that will advance knowledge of environmental impacts and be used to mitigate injuries, and (c) the process-oriented science required to fully understand the ecological impacts of beach nourishment is funded. Unless agency practices change, environmental uncertainty over impacts of beach nourishment will persist, and projects will continue to externalize significant costs by passing on natural resource injuries to the public at large without due avoidance, minimization, and mitigation.

Acknowledgments

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Foley, Cindy T SAJ

From: damy5@juno.com
Sent: Friday, October 07, 2005 3:13 PM
To: CESAJ-CC, PublicMail SAJ
Cc: ernest.brown@brevardcounty.us
Subject: Midreach Beach Dredge and Fill Project.

Please put me on record for being Against the MidReach Beach Dredge and Fill Project in Brevard County.

I've lived in Satellite Beach since 1979 and feel that covering the rocks in Satellite is a mistake. The rocks help break up the surf before it hits the dune line and lessons the effect of dune erosion. Also, the fishing will be ruined along with the surfing breaks.

Thanks for hearing my input!

Against MidReach Beach Dredge

David Reid
100 Hilliard Lane
Merritt Island, fl 32952
damy5@juno.com

Foley, Cindy T SAJ

From: Peter and Kathy Juergensen [kjuergensen@earthlink.net]
Sent: Friday, October 07, 2005 11:31 PM
To: CESAJ-CC, PublicMail SAJ
Subject: comments on midreach project

I just reviewed the presentation from Sept.8th and had a couple of concerns. As someone who regularly enters the ocean to swim and surf, I have noticed some changes in the ecosystem after the sand renourishment done in the North and South Reaches. Water clarity in general in he surf zone has been markedly degraded, causing eye discomfort and making it more difficult to negotiate the Coquina reef when getting in and out, and judging where the reef is has become more difficult when surfing to avoid the rocks. If this route of action is chosen, is there a way to reduce the amount of fine silt that is mixed in the replacement sand so that visibility doesn't suffer further?

Renourishment may yet be the best (if only temporary) solution though, depending on what the alternatives are. If any of the alternatives involve placing objects in the water, please consider the safety of those of us who surf in these waters. Getting raked across the reef is bad enough, but getting impaled on some structure in the water would be infinitely worse.

Thanks for allowing me to voice my opinion,

Peter Juergensen
Satellite Beach, FL

Foley, Cindy T SAJ

From: Kevin Colber [kevin@southernphotosupply.com]
Sent: Saturday, October 08, 2005 10:10 AM
To: CESAJ-CC, PublicMail SAJ
Subject: I oppose this action

Dear sirs,

As a resident of Indian Harbour Beach I oppose this action. The fragile ecosystem of our near shore worm rock and coquina habitats may not be able to tolerate this change to their environment. Furthermore, scientific evidence has not been produced that substantiates the anticipated effects on the wave action and shoreline cyclical rebuilding. Please take more time to study the situation instead of rushing into a quick fix which will be undone just as soundly as the northern project was undone in the last twelve months. Nature will have her way and taxpayers will have gained nothing for the money spent.

Regards,
Kevin Colber
Indian Harbour Beach, FL

Foley, Cindy T SAJ

From: georgesandcarmen@earthlink.net
Sent: Saturday, October 08, 2005 11:20 AM
To: CESAJ-CC, PublicMail SAJ
Subject: cquina shelf renourishing plan

georgesandcarmen@earthlink.net
EarthLink Revolves Around You.

I am a current resident of Satellite Beach and I do not approve of the idea to disturb our coquina shelf in any way. I hope the army corps of engineers stays in the path of renurshing the dunes with dredged sand. to move or add rock may severe ecological habitat and possibly endanger tourist in our ocean.

e

ENVIRONMENTAL DEFENSE

finding the ways that work

Oct. 8, 2005

Paul Stodola
Jacksonville District, Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232

Re: Scoping Comments on Brevard Mid-Reach Dredging Project

Dear Mr. Stodola,

Please accept the following scoping comments regarding the Brevard County Mid-Reach Dredging Project from Environmental Defense. Established in 1967 as the Environmental Defense Fund, we have 400,000 members (over 20,000 in Florida) and have long used leading-edge science to craft innovative solutions for complex policy issues. This particular project highlights diverse issues of beach and reef management, and the role of open public comment.

Bipartisan Expert Consensus

Recent bipartisan commission reports at the highest federal and academic levels, the U.S. Commission on Ocean Policy and the Pew Oceans Commission, have both concluded that US fisheries are in significant decline, the habitats that support these fisheries have been lost at unprecedented rates, and coastal construction activities require greater impact evaluation. Critically, both commissions recommend action, not rhetoric, in terms of bringing ecosystem-based science into direct play at federal, state and local management levels.

Florida environmental management institutions have instituted an ecosystem-based approach to coastal management for over a decade. However, growing concerns regarding the effectiveness of past and current efforts have also led to two new state commissions. Increasingly precautionary positions are being expressed by leading scientists and managers on the decline of Florida's coastal resources, again, with an emphasis on direct application of the best available science.

Reef and Faunal Impacts

The nearshore reef system that will be buried by this project is federally designated as a Habitat Area of Particular Concern – the highest form of federal Essential Fish Habitat under the 1996 Sustainable Fisheries Act. Various studies of invertebrate and fish populations of East Florida have identified over 500 species in association with nearshore reefs (Gilmore, 1977; Nelson, 1989; Lindeman and Snyder, 1999). A significant fishery subset of these species, tarpon, pompano, etc., are also federally designated as Aquatic Resources of National Importance. Independent research by leading scientists, not skewed by potential conflicts of interest, has clearly demonstrated that there have long been major problems in the sampling design and overall monitoring components of large beach dredging projects; these include chronic underestimation of project impacts, skewed analyses in the NEPA literature (Why is Nelson (1989) almost never referenced? After >100 "renourishments" in SE Florida alone, why are

significant impacts still never identified? etc.), and a number of other deep analytic problems that persist (Peterson and Bishop, 2005).

Given the bipartisan expert commissions urging serious application of independent science, these problems are becoming more apparent, absent real efforts at correction. In terms of the Brevard project, the reefs that will be buried are important nursery areas for the earliest demersal life stages of many fish and invertebrate species. These immediate post-planktonic early life stages can show many morphological attributes of larvae and are not adapted to simply swim away. Claims that the fishes will just swim to other rocks misrepresent the scientific reality by ignoring prior developmental ichthyology research and also by assuming that there will rocks for new recruits to swim to if they somehow survive the burial of large parts of the reef system.

Meanwhile, what of all the hundreds of sessile or low mobility species? Crabs, mollusks, and many other fauna and flora will suffer mortality in high numbers. Such points are commonly ignored by dredging proponents. There is also considerable information suggesting that these reefs are intermediate nursery habitats for juveniles of several species of endangered sea turtles, with the reefs providing both food and shelter resources. Long-time users of the reef, fishers and surfers, often comment on the frequency with which juvenile turtles surface for air, often many at a time in shallow reef areas. The above and related points require thorough consideration in any NEPA documents being developed for this project.

Rigorous discussion of this and other massive dredge and fill products has also been buried under misleading euphemisms. One example: explicit strategic guidance from some Brevard county employees to never call the system a reef, but to always call the system "rocks". This system qualifies as a reef under independent biological or geological definitions (Kirtley and Tanner, 1968; Pandolfi et al., 1998). This also applies to prior, scientifically unfounded efforts to brand the project as "worms versus beaches." At this stage of deliberation, such rhetoric should not even be a discussion topic.

<u>The Users of the Reef System and the Public Comment Process</u>

Thousands of Brevardians grew up in association with the reef system as surfers, fishers, or beachwalkers who enjoy occasional tidepools and a living intertidal system. Hundreds of mainland and island families are now raising their children as young surfers and fishers of the reef system as well. However, the multiple generations of in-water users of the system are being drowned out by politically connected beachfront condominium owners. For example, at the ACOE public hearing in Satellite Beach on Sept. 8, to the shock of approximately 20 dredging opponents in the audience, a 30 minute pro-dredging powerpoint presentation by the local condominium group was introduced by the ACOE - *before the open public comment session, and without opportunities for equal time.* Following this show, and the hour long ACOE presentation before it, the ACOE then spent approximately 15 minutes introducing the rules for the public comments – while many members of the general public left the auditorium.

By the time the true public comment period finally started, large numbers of attendees had left the meeting without hearing a single public comment. In our decades of experience with public hearings involving controversial expenditures of public funds, the presentation of a long powerpoint show reflecting only one opinion without equal time for differing points of views is essentially unprecedented. The Brevardians not connected to the beach condominium political machine left the meeting with little faith for a chance at equal opportunities for public comment.

This, coupled with alleged tactics in the past to intimidate opponents (see Save the Waves letter to the Corps dated Jan 2005), raises a variety of questions about opportunities for pluralistic evaluation of taxpayer subsidies for high-risk coastal construction in Brevard County. The significance of anti-subsidy feelings among Brevardians west of A1A is further substantiated by letters to the editor published in the primary local newspaper, *Florida Today*, subsequent to the meeting. One subset of these letters is included here as an attachment. These five attached letters came out a week after the Sept 8 hearing in response to news coverage of the event. From residents throughout Brevard County, these letters drive home many of the concerns expressed below and above. Notably, there was no well-connected lobbying effort behind this. The great majority of Brevardians probably have limited sympathy for short-term taxpayer bail-outs for high-risk condo properties.

Thorough Alternative Analyses

Due to precedent at many levels, NEPA documents require comprehensive analyses of alternatives. Many independent experts on coastal geology and biology (e.g., Bush et al. 2004) suggest that alternatives that include the following be evaluated in an independent and thorough manner: fixed sand transfer plants (in this case at Port Canaveral); constraints on continued federal subsidies to rebuild high-risk beachfront property (see attached letters to *Florida Today*); elimination of new construction east of A1A since it will only increase pressure for more subsidies as damage inevitably occurs – subsidies that inland taxpayers largely finance.

There are still opportunities to balance out this policy trajectory. We thank you for your efforts to address these issues and appreciate the opportunity to offer comments.

Sincerely,

Dr. Ken Lindeman
Senior Scientist

Daniel Whittle, Esq.
Senior Attorney

Dr. Michelle Duval
Senior Scientist

Environmental Defense, Southeast U.S. Oceans Program
2500 Blue Ridge Rd., Ste. 330, Raleigh, NC, 27607

Citations:

D.M. Bush, W.J. Neal, N.J. Longo, K.C. Lindeman, D.F. Pilkey, L.S. Esteves, J.D. Congleton, and O.H. Pilkey. 2004. Living with Florida's Atlantic Beaches: Coastal Hazards from Amelia Island to Key West. ***Duke University Press.*** 338 pp.

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Attachment 1 (next two pages). Five letters from Brevard County expressing concern over subsidized beach dredging. *Florida Today*, Sept. 14, 2005.

Shoring up the beaches

SEPT. 14, 2005; Florida Today; 5 letters from throughout Brevard county.

Rebuilding beaches a waste of time, sand

There was an interesting juxtaposition in Friday's FLORIDA TODAY.

The lead article in the Space Coast section described local beachside residents searching for ways to replenish the beaches as soon as possible.

But an article on the State page said Gov. Jeb Bush is contemplating not restoring the beaches at all.

While I usually don't see eye to eye with our governor, this time I do.

Florida's beaches are the result of barrier islands, which are sandbars that are above sea level under normal conditions. One cause of beach erosion on these islands is the jetties that disturb the natural offshore flow of sand.

However, like any other sand-based deposit, barrier islands migrate as sand is naturally eroded in one place and built up in another.

Unfortunately, roads, buildings and houses do not migrate with them.

If I built a home in an area that constantly flooded, I would not expect the government to replace my home and [illegible]

File photo

Beach projects. Sand is shoveled under a dune crossover after a portion of south Cocoa Beach was renourished in 2001.

We should not be throwing good money after bad to replace sand that will wash away as fast as we put it down.

Patrick Bryan
Grant

Let's try new mindset in dealing with erosion

Some residents have expressed legitimate concerns about beach erosion, such as that caused by tropical systems near our shores, as Ophelia did last week.

Not all of us agree that taxpayers should pay the bill for dumping more sand on the beach, only to watch it wash away in the next storm.

Gov. Jeb Bush suggested a better idea: Reconsider the blank check approach to beachfront development and unquestioned "renourishment."

I'd suggest a few other ideas:

- Let nature work it out. Sand has always moved in and out, and over time beaches tend to heal themselves. Scientists know more about this than developers.
- Artificial replenishment rarely works. The Corps of Engineers has studied this for decades and knows a lot about it.

beaches and everyone could enjoy them. Now we have condos, apartment buildings and businesses blocking the view.

Our elected officials want more businesses and tell people to come to Florida. But in the next breath they tell us not to water our lawns because of water shortages.

I was born here and remember when it was beautiful and we could swim in the river.

Progress is the controller, and big money feeds the ones in control.

Sandra Cossairt
Grant

Make beach dwellers pay advance on sand

The headlines Friday in FLORIDA TODAY read: "Residents plead for sand."

Anyone who builds a home on the beach apparently doesn't understand basic geology. No matter how many times the beaches are replenished, unstoppable processes will predominate.

Beach replenishment is not free. Guess who pays for it? Not the homeowner, but the taxpayer.

A partial solution to this problem would be to require those who build

money and bad to replace sand that will wash away as fast as we put it down.

Patrick Bryan
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■ Let nature work it out. Sand has always moved in and out, and over time beaches tend to heal themselves. Scientists know more about this than developers.

■ Artificial replenishment rarely works. The Corps of Engineers has studied this for decades and knows a lot about it.

■ A small sand trap or jetty may capture some sand, but it usually comes from some other part of the beach where it creates even more erosion. Satellite Beach has numerous examples.

■ So-called "renourishment" costs too much, and its benefits are too few. Last year's price tag for taxpayers was more than $140 million, and it didn't really work out very well.

Our local newspaper could help the public understand these issues much better if it did a better job reporting the science and politics involved.

Sanders LaMont
Satellite Beach

Coastal builders drive beach policy

When will our elected officials make the developers stop running the show?

They let them build right to the edge of the ocean. Then the developers get mad because the government won't pump more sand that cost millions, to be washed away year after year.

I realize people like the ocean, but building so close comes with problems.

them. Now we have condos, apartment buildings and businesses blocking the view.

Our elected officials want more businesses and tell people to come to Florida. But in the next breath they tell us not to water our lawns because of water shortages.

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Beach replenishment is not free. Guess who pays for it? Not the homeowner, but the taxpayer.

A partial solution to this problem would be to require those who build on the beach to provide a substantial deposit covering the cost of beach replenishment.

The same approach would apply to anyone building a home in a hazardous area, such as Californians who build expensive homes on the San Andreas fault.

Donald E. Zimmerman
Satellite Beach

Don't make us pay for fight with nature

Our beaches, just by nature, are bound to erode faster — eventually, Florida will be a much narrower peninsula.

So why do we pay for the homes that are destroyed over and over? And why do we bring the sand when these homeowners yell for it after storms?

The beaches should be public and not theirs only. With their riches, they should not be allowed to rebuild beachside.

It is our money being used to replenish the beaches. Don't these property owners and our government realize the force of nature, and how little by little our state will be eaten up?

Jane A. Farmer
Suntree

SEPT. 14, 2005

FLORIDA TODAY

FLORIDA SPORTSMAN

To: Paul Stodola
Jacksonville District
Army Corps of Engineers
PO Box 4970
Jacksonville, FL 32232

From: *Florida Sportsman/Shallow Water Angler* magazine editors
2700 S. Kanner Hwy.
Stuart, FL
349990

Cc: Senator Bill Nelson
Representative Dave Weldon
Brevard County Commission
George Getsinger, NOAA

Dear Mr. Stodola and copied parties;

The purpose of this letter is to express our concerns regarding a proposed "beach nourishment" project for the "Mid Reach," in Brevard County, FL. Our publications advocate for recreational anglers, divers and wildlife habitats. Combined, *Florida Sportsman* and *Shallow Water Angler* are supported by a readership of nearly 250,000 readers. And, our two TV programs and radio shows attract massive and loyal audiences.

We have closely watched the players behind this beach dredging initiative since concerned readers informed us that Brevard County Commissioner Jackie Colon threatened to "squash" anyone that opposed it, and since the group calling themselves SOS publicly expressed a willingness to use intimidation tactics against any opposition. While such tactics are commonplace in the battles over these massive dredge-and-fill projects, the commissioner's behavior, never mind the SOS tactics, is quite frankly, inexcusable, and probably illegal.

Colon, SOS and Brevard Natural Resources Director Ernie Brown have consistently and belligerently insisted upon downplaying the ecological value of the nearshore reefs off Satellite Beach. Our staff and contributors witnessed both the Commissioner and Mr. Brown giving tactical advice to SOS at a meeting earlier this summer, and a public facility was provided for the meeting, *gratis* to boot. Both individuals told the audience to be careful to call these reefs, "rocks," and that the "wormreef and EFH business is nonsense invented by radical environmentalists." Brown

WICKSTROM COMMUNICATIONS DIVISION OF PRIMEDIA, INC.

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also told them not to draw attention to the fact that due to recent storms even more reef has been exposed, lest further mitigation be required.

Clearly, Colon, Brown, and SOS do not understand or do not want to understand Florida's geological history, or why these habitats are federally designated Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC). If Mr. Brown is sincerely ignorant about Florida's geological history and about the habitat values of nearshore reefs, then we must ask why he was hired to steward Brevard's tremendous natural resources. We will investigate if Mr. Brown violated state laws by advocating for a radical property-rights lobbying group while serving as a public servant. Given Colon's threats and the fact that SOS was allowed to make a mendacious Powerpoint presentation at the public comment hearing while project opponents were allowed no opportunity present the facts, we think that there are sufficient, well-documented NEPA violations to sanction Colon and restart the NEPA process.

Perhaps, in light of these complaints, the commission and Mr. Brown would sponsor a meeting devoted to educating the community about the value of nearshore reefs, the impacts of "beach nourishment" on beach invertebrates, and the litany of woes such projects can cause sea turtles. Terry Gibson, our beaches expert, would be happy to give a seminar and line up other expert speakers. He serves as the Florida Recreational Fishing Advisor to the South Atlantic Fisheries Management Council's Habitat Advisory Panel.

Gibson, an expert surfer and contributing editor to both *Surfer Magazine* and Eastern Surf Magazine (the latter is in Melbourne), recently gave an interview to Primedia sister publication *Surfer Magazine*, that gives a rundown of the ecological concerns in layman's terms. You can read it online at, http://www.surfermag.com/features/oneworld/fl_bch-erosion/index.html. The three-part investigative series he authored about so-called "beach nourishment" in Florida, which appeared in the April, May and June 2005 issues of *Florida Sportsman*, is also available for your edification online at, http://www.floridasportsman.com/confron/0504144/. And, we have attached/enclosed an article in *Shallow Water Angler* magazine about why fishing around *P. lapidosa* (worm) colonies is so productive.

We ask that you, Mr. Stodola, place these articles and the interview in the public record, and list them in the appendix of the SEIS.

Briefly, the Mid Reach reefs offer the only complex hardbottom habitats on the windward side of the entire barrier island. We have enjoyed great fishing there and have run stories about the tremendous surf fishing that stretch of beach offers. (It may interest you to learn that the commercial pompano fishermen have abandoned the North Reach since it was dredged.) The abundant worm colonies tremendously enhance the habitat value because the juvenile fish like to hide in the interstitial areas and feed on a variety of tiny crustaceans closely associated with *P. lapidosa*. Bigger gamefish, in turn, feed on them and on other species that are either closely associated with *P. lapidosa*/nearshore hardbottom, or on mullet, sardines and glass minnows that use the structures opportunistically for cover.

Kind-for-kind habitat mitigation is not possible. Many species of post-larvael reef fish settle first on those shallow reefs. Those tiny fish need clean, very shallow, noisy water and contrary to what SOS's Cliff Dickenson ignorantly maintains, they simply will not settle and survive on deeper reefs. (Sea turtles also depend upon the reefs at various

life stages.) As the snappers, grunts, groupers and wrasses grow older, they migrate offshore to deeper reefs, where commercial and recreational anglers harvest them. Essentially, these reefs are supporting bottomfishing in the region, which is a major part of your huge recreational fishing industry. Seasonally, these reefs offer very good snook, tarpon and pompano fishing. In fact, one of the most celebrated tarpon fisheries in the state occurs in the waters surrounding those reefs. In our experience, "re-nourishment" causes chronic turbidity, which deters prey and the gamefish that they attract. Further, these projects typically eliminate coquina clams (*Donax spp.*) and impact sandflea (*Emerita spp.*) populations that fish such as pompano and shorebirds depend on for forage.

If you would like to see firsthand several of the state's top fisheries that were destroyed by this practice, we extend a standing invitation to the Corps, SOS and the Brevard Commission to pay us a visit here in Hutchinson Island. Partially because of the recent coastal dredging, the local recreational fishing industry revenues are down 30 percent. Keep in mind that recreational fishing in salt water is $6 billion industry, and is Florida's largest tourism draw.

To close on the economic note, we feel that "beach nourishment" is a very poor investment just for the transitory and flimsy protection of a few buildings, especially when you consider the harm the practice is doing statewide to the sustainability of the fishing, diving and surfing industries. The beach belongs to public. It is not a berm to protect a few phenomenally stupid real estate investments, and even the most carefully monitored project that uses trucked-in sand is likely to have silt/mud components that could wash into the surf zone. It would be better to get an operational sand transfer plant in place at the Canaveral inlet, declare a moratorium on beachfront development, and adopt a fair managed retreat program. There are many millions of cubic yards of beach sitting under those condos.

Please confirm that you received this letter, and that it has been included in the public record.

Sincerely;

The Editors
Florida Sportsman
Shallow Water Angler

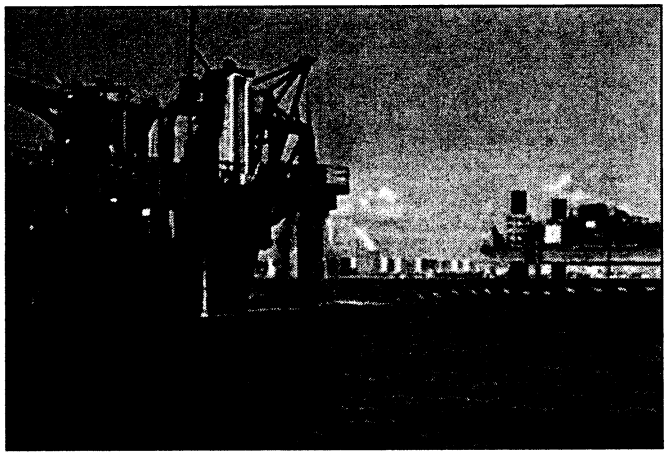
April 2005

Excessive Dredging Threatens Florida Marine Life

Investigative Series: 1 of 3. [Read Part II] [Read Part III] [See the Photos]

By Terry Gibson

Some "beach re-nourishment" projects may really be acts of marine genocide.



Offshore dredge vacuums up fill material. Little is known of the long-term effects on bottom-dwelling organisms, but turbidity and collision impact on nearby coral reefs are well documented. The product, in short supply, often has more in common with mud than the polished quartz found on natural beaches.

Four hurricanes don't hold a candle to the potential fish habitat disaster funded in the name of "shoreline protection."

In the wake of last season's storms, a panic-driven number of shoreline-armoring projects and so-called beach nourishment projects are proceeding throughout the state.

continue article

Fishing O
Sanibel
Florida
Coastal
Ocean
Marine

Bulldozers are burying famous pompano beaches of Martin County. The wonderful snorkeling reef at Phipps Park in Palm Beach County is doomed. Dredges are on the way to Sanibel and Captiva islands' legendary snook beaches, among many others.

Meanwhile, marine scientists, environmental groups, veteran anglers, the dive community, the surfing community, and tax-dollar watchdogs such as Taxpayers for Common Sense say that much of the coastal armoring and sand dredging needs to be curtailed, if a goal is to protect biological diversity and abundance as well as outdoor recreation along Florida's coasts.

Some "beach re-nourishment" projects may really be acts of marine genocide.

These voices, it seems, are being drowned out by special-interest lobbyists from the American Shore & Beach Preservation Association (ASBPA) and the Florida Shore & Beach Preservation Association (FSBPA). Largely comprised of dredging contractors, coastal engineers and consultants who specialize in coastal construction, ASPBA/FSPBA has consistently maintained that beach nourishment causes only short-term turbidity with short-term environmental impacts. The majority of peer-reviewed scientific literature and anecdotes from anglers and divers contradicts this position. Due to the gravity of the threats, a three-part investigative report will run in the April, May and June issues of Florida Sportsman. We are examining the environmental legacy, the politics of and sustainable alternatives to seawalls and massive dredge-and-fill projects euphemistically termed by proponents as "beach nourishment projects." Many experts say that in many cases there are better ways to save our beaches.

"Erosion isn't a problem for beaches, just for buildings." That famous and comprehensive statement came from Dr. Orrin Pilkey, renowned Duke University professor and author of The Corps and the Shore. Without condos stepping on the dunes, and without jetties to stop the natural longshore migration of sediments, Florida's barrier islands would simply be reshaped rather than destroyed by storm events such as hurricanes and nor'easters.

But with buildings in place and sea level rising ineluctably, coastal engineers first responded with seawalls, jetties and groins, collectively termed "shoreline armoring." Those hard structures only exacerbated erosion, so, by the 1970s, coastal engineers began promoting the "re-nourishment" concept

as an environmentally friendly alternative to shoreline armoring. In the mid-'90s, the U.S. Army Corps of Engineers released a 3-foot high, 15-pound document called the Coast of Florida Erosion and Storm Effect Study. Many thousands of pages thick, the study devotes one paragraph to the potential cumulative environmental impacts of the hundreds of shoreline-protection projects it proposes over the next 50 years. And, the paragraph concludes that only "cumulative benefits toward the natural coastline would be realized by all projects under the Coast of Florida Study." This after vast segments of coral and nearshore reefs were destroyed by Dade County projects, and in other locations throughout the '80s.

"Siltation and indirect burial from re-nourishment projects was largely to blame for the death of shallow coral reefs along Miami Beach," acknowledged Steve Blair, who runs Miami-Dade's beach nourishment program. "But, the technology has come a long way since then."

Junvenile snappers, grunts and other important species require exposed hardbottom habitat. This particular limestone outcrop (among acres of similar ones in Martin County) is now covered by the kind of fill material often used in dredging.

Today's full-scale beach restorations require the mining of up to two million cubic meters of offshore sediment, usually in 20 to 50 feet of water close to offshore reefs. The material is then pumped on the beach and in the surf zone. Advocates say mapping technology and innovations in fill placement can reduce reef impacts. Critics counter with a litany of environmental woes attributed to dredge-and-fill projects waged with heavy equipment in extremely sensitive areas.

Contractors hired by the Corps use cutterhead or hopper dredges for excavation. Almost all seafloor-dwelling marine life occurs in that 6-inch margin of "topsoil," and the dredge kills all manner of organisms— shrimp, crabs, mollusks, worms, seagrasses and more—across square kilometers of the continental shelf.

"The prevailing wisdom has been that the soft-bottom dwellers come right back," said Phil Flood, Environmental Manager for the Department of Environmental Protection (DEP) Office of Beaches & Coastal Systems. Marine scientists and other observers (e.g. divers) doubt the validity of that assumption. For perspective, I conducted a thorough search, but failed to find any peer-reviewed studies of borrow-site impacts. That's alarming.

1 | 2 **Next>>**

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Excessive Dredging Threatens Florida Marine Life

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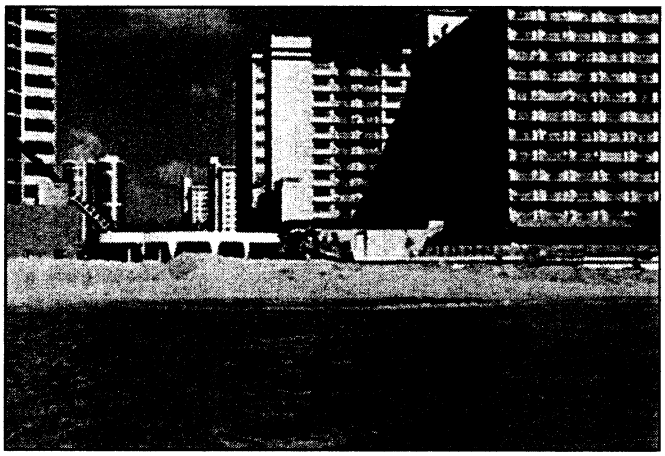
The potential impacts to coral reefs and live bottom are better understood, and project applicants now must provide "reasonable assurance" that coral reefs and live bottom won't be harmed and that nearshore hardbottom won't get buried without mitigation. But depending on who you ask, "reasonable assurance" is a gray area, and mitigation reefs rarely remain uncovered to achieve the specific ecological functions of nearshore hardbottom.



Bulldozer spreads sediment on Dade County surf zone. Top marine scientists and anglers decry the consequential smothering of gamefish habitat and forage.

After decades of reef degradation by dredging, DEP and other regulators now require buffer areas between the dredge sites and reefs, which are federally designated as Essential Fish Habitat and/or Habitat Areas of Particular Concern. But, there are no consistent standards, and as sand supplies shrink, regulators will likely face pressure to decrease buffer distances.

Indeed, it's already happening. A permit issued for four Broward County borrow sites requires the dredge operator to stay only 400 feet from 1,000-year-old coral reefs that contain almost half the coral species found in Caribbean waters. Marty Seeling, DEP Environmental Administrator of the Bureau of Beaches & Coastal Systems says, "The Corps balked at 400 feet, and insisted upon only a 200-foot buffer. But we wouldn't give in." Still, activists who discovered a staghorn coral colony overlooked by the Corps studies say the buffer isn't sufficient, and that the sediments will also

migrate offshore and bury shallow coral reefs.

continue article

"The proposed massive dredge-and-fill project will add chronic silt, sediment and turbidity impacts to coral reefs and hardbottom already stressed by algae and pollution," testified Dan Clark, Director of Cry of the Water, a Broward County coral reef monitoring group, before the Coral Reef Task Force.

Meanwhile, the value of nearshore reefs is becoming better understood. Nearshore hardbottom (a.k.a. worm reef or coquina reef) provides habitat to more than 530 marine organisms, including 320-plus animals. It's home for a variety of post-larval and juvenile snappers, grunts, groupers and wrasses (e.g. hogfish), plus a variety of reef cleaners. An early paper (1989) written by Walter Nelson entitled "Beach Renourishment and Hardbottom Habitats: A Case for Caution," wryly stated that, "Direct burial will be a terminal problem for many of the organisms that live on hard bottoms."

Moreover, wind, waves and tides carry these sediments well beyond the seaward and longshore boundaries of the fill site, burying or scouring additional reefs, snuffing photosynthesis in algae and corals and making it harder for juvenile drums, pompano and other gamefish to see prey in the surf zone. These re-suspension events can last from hours to decades. Dr. Hal Wanless, Chairman of Geological Sciences at the University of Miami's Rosenstiel School explains that it has do with the nature of the sediments.

"Except for shallow shoals where sediments have recently been exposed to wave energy, there really aren't any offshore sediments suitable to place on the beach," Wanless said. "The sediments mined offshore either 'grew' there or migrated there because they're too fine to stay on the beach. Even when the grains are roughly the same size as the polished quartz beach sediments, they won't behave the same in the surf zone. They're hollow, angular shell fragments that have been bored into by algae and microorganisms. Once they're placed in a high-energy environment they break apart, release fine sediments into the surf zone, and migrate rapidly along with the silt component back offshore."

This explains why "re-nourished" beaches erode much more quickly than

undisturbed beaches. It also explains the reef impacts, and, in terms of water quality, it explains why the surf zones of disturbed beaches in places such as Juno Beach, Jupiter Island, Fort Lauderdale and Longboat Key turn milky when the tradewinds blow. Most insidiously, it also points to why experienced surf anglers avoid "re-nourished" beaches, and reinforces the findings of a peer-reviewed study in North Carolina that showed an 86 to 99 percent decrease in sandfleas (Emerita talpoidea) ten weeks post-nourishment. Subsequent monitoring showed hardly any long-term re-recruitment of this vital forage species on several repeatedly filled beaches in North Carolina, apparently "as a consequence of the poor match in sediment grade." In a survey of 45 South Florida anglers with more than 1,100 years combined fishing experience, the majority of anglers, including three bait & tackle shop owners who sell sandfleas, said that beach-fill projects had reduced or eliminated sandfleas along Southeast Florida beaches. There aren't any monitoring studies of beach-invertebrate impacts under way in Florida; meanwhile, emerging bonefish and permit research gives even more cause for concern for beach invertebrates.

"We now know that permit spawn year round, and that juveniles less than six inches long need windward beaches for habitat," explains Dr. Aaron Adams, a Mote Science Foundation researcher and author of The Fisherman's Coast. "New data also suggest that juvenile bonefish also prefer windward beaches."

These juveniles are too small to devour sandfleas, and scientists think they're feeding on micro-invertebrates such as amphipods. (A family of tiny, lobster-like crustaceans.)

"Flats guides in Biscayne Bay, for example, may have a real reason to be concerned about beach nourishment projects," Adams says.

In the May issue, learn why politicians are under so much pressure to fund projects that carry a documented number of negative impacts.

[Read part II]

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Despite Damages, Florida Seems Addicted to Sand Pumping

Investigative Series: 2 of 3. [Read part I] [Read Part III] [See the Photos]

By Terry Gibson

Pelicans ambush mullet on reefs at Phipps Park. Turtle experts confirm there's no reason to expand the beach, and the reefs provide essential food and cover for juveniles.

This year, approximately $117 million in federal tax dollars will be spent on "beach nourishment" in Florida, augmented by at least $30 million from state coffers, plus funds from local entities. Some of that money will go to vital dune restoration projects, but most will go to dredge-and-fill projects ranging from 200,000 to 1.5 million cubic meters in volume.

Florida Statute, Title XI, Chapter 161, declares "beach nourishment" to be in the best interests of Florida citizens. More than $886 million has been spent since the 1970s on beach-fill projects—more than in any other state. As covered in the April 2005 issue of Florida Sportsman, almost all peer-reviewed science and observations by anglers and divers point to serious ecological and recreational expenses. Advocates for the dredging and consulting industries justify the work with economic studies highlighting the need to maintain beach cosmetics for tourism revenue and property taxes.

Debbie Flack, Florida Shore and Beach Preservation Association's (FSBPA) director of legislative affairs said, "Florida's beaches create 706,000 jobs, and tax revenues from the properties they protect support our hospitals and schools."

continue article

Flack is a former chief of the Florida Department of Environmental Protection's (DEP) Office of Beaches and Coastal Systems. Flack's primary lobbying tool is an economic assessment of Florida beaches conducted by Dr. William Strong, an economist at Florida Atlantic University. In 1997, she helped convince state legislators to create the comprehensive beach-funding plan. Subsequently, Flack told the Gannett News Service, "I tried to package this as an environmental program, but our selling point was economic development."

Indeed, tourism and property taxes account for massive economic injections. Flack said the numbers exceed $50 billion to date, without offering a specific time frame. And while Strong's research is reviewed, it seems paradoxically comprehensive and generic. While the survey counts all beachgoers, the research does not take into account why individuals go to the beach, or to specific beaches. For example, it does not say how much divers spend to scuba dive healthy reefs in clean water in Southeast Florida, or how much anglers spend to catch pompano on Indian River County beaches, or how much surfers spend because of the waves that break over the nearshore reefs in Brevard County. (The latter group, you might be surprised to learn, contribute more than $1 billion annually to Florida's economy on the statewide level.)

The dredging lobby points to mitigation efforts. These, however, rarely entail or succeed in providing kind-for-kind habitat mitigation. Mitigation for nearshore reef burial usually entails an artificial reef placed in water too deep to provide the shallow structure required by juvenile snappers, grunts and groupers, among many other species that depend on unburied nearshore reefs.

"It's not that we want these projects to impact anglers, but anglers represent a much smaller percentage than tourism overall," Flack said.

A Florida Fish and Wildlife Conservation Commission (FWC) study, Economics of Fish and Wildlife Recreation, attributes more than $5.5 billion of the annual gross state product to saltwater fishing, and nearly 60,000 jobs. The sum is likely an under-estimation because shorebound anglers don't need a fishing license, and the Florida Marine Industries Association estimates that more than half of the reason for boating is fishing. The FWC estimate for dollars generated by boating is $15.7 billion. In addition, agency officials admit—and dive shop owners in Dade, Broward, Palm Beach and Martin counties verify—that reefs that supported diving have been destroyed or obscured for long intervals by dredging projects since the 1970s.

Dr. Grant Gilmore, the scientist who first cataloged the fish in the Indian River Lagoon, and along the Treasure Coast's many nearshore reefs, says these projects may be curbing angler success and enthusiasm no matter where you fish in salt water.

"The nearshore environment is so important to so many juvenile gamefish and forage species that individually and cumulatively these projects can impact fishing off the beach, in the lagoons and on the offshore reefs," he said. According to Gilmore and other top scientists, juvenile gag grouper, mangrove snapper, yellowtail, muttons, lane snapper, flounder, permit, pompano, grunts, assorted drums and all sea turtles—adult or juvenile—can be impacted due to habitat loss or diminishment of forage.

A search discovered 11 peer-reviewed scientific papers that documented serious impacts, and increasingly, agency-generated papers are recognizing more of the impacts anglers complain about. But Howard Marlowe, Director of Legislative Affairs for the American Shore and Beach Preservation Association (ASBPA), and who represents Martin County and other Florida municipalities, disagrees with independent scientists, anglers who have observed impacts, and divers who witness them.

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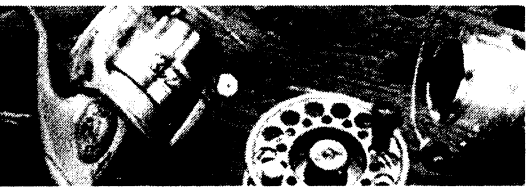

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Addicted to Sand Pumping

Marlowe and the ASBPA aggressively attack anyone who questions the environmental impacts or economic equity of large-scale coastal dredging, such as the National Wildlife Federation and D.C.-based Taxpayers for Common Sense.

In a phone interview per request of Florida Sportsman, Marlowe stated categorically that, "Fish catches have never been interrupted for more than 30 days by beach re-nourishment. And there's evidence that shows the organisms living in the beach return quickly."

Fishermen and divers—witnesses to serious impacts from past projects—are appalled by ASBPA/FSBPA lobbying tactics.

Filled beaches are more erosion prone and leave escarpments difficult for angler, never mind sea turtles, to climb.

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"Their approach reminds me of tobacco industry lobbyists," said Jim Harter, president of the Stuart Fly Anglers club. "We demand an opportunity to rebuke him before the Martin County Commission."

Marlowe and Co., which specializes in this style of lobbying, represents at least 30 municipalities around the country. Martin County, Florida, alone pays him $39,500 per year. According to FSBPA's 990 forms, Flack earns $103,000 for lobbying for dredging funds, and according to other news sources, she also represents individual municipalities.

Because of the war in Iraq, Marlowe and Flack face increasingly tight-fisted legislators, who are debating funding allocations for Water Resources Development Act (WRDA) projects, which include beach nourishment projects. WRDA would also fund the Comprehensive Everglades Restoration Plan, but Everglades Restoration must compete with the beaches for attention six months after four hurricanes racked Florida, the most in over 100 years. But Flack and Marlowe are extremely close with some legislators, consulting companies and agency personnel that depend on dredging contracts.

For example, at a St. Lucie County meeting sponsored by state legislators, Flack was given a seat and a microphone alongside legislators and senior DEP officials.

"We're not only going to re-nourish eroded beaches, we're going to add to beaches that aren't eroded yet," she promised a large audience of mostly beachfront property owners. DEP personnel, as well as a number of county employees, nodded in agreement. We recognized Martin County Coastal Engineer Kathy FitzPatrick, whose boss, Don Donaldson, is Chair of FSBPA.

Critics say that the dredging lobby is governing our beaches, and that Harter's tobacco analogy is apropos—that beachfront interests are addicted to sand pumping. The addiction metaphor works in terms of what scientists, anglers and divers say, that "beach nourishment" is contributing to the steady decline of our coastal ecosystems.

And, it looks like we're running out of the drug.

"Most of the compatible sand, the cheap sand at least, is gone in the southeastern counties," said Phil Flood, an environmental manager with

DEP's Beaches office.

That's a concern for some local governments because economic analyses and Army Corps permits show that "shoreline protection" is the primary benefit of the beaches. The tax bases generated by high-density, oceanfront properties keep property taxes down. And, nourished beaches have in places performed well as buffers, but the durations of their storm-shielding capabilities vary depending on the wave environment, age, design, sediment type, storm intensity and storm frequency.

"It appears to me that many of these projects disappear more rapidly than predicted for the re-nourishment cycle," said Dr. Robbin Trindell, FWC's senior sea turtle researcher.

Critics also say beach-fill projects merely give beachfront property owners a false sense of security about living in danger zones.

"It's psychological," said Steve Ellis, Vice President of Programs for Taxpayers for Common Sense. "When people see a big flood control project—which is what these things are—they feel they're safe. Beach nourishment encourages unsustainable growth and keeps people in harm's way. We've all seen it time and again where hurricanes kill people, destroy property, someone rebuilds, and it happens again."

It's not clear if people working in the lucrative beach-building industry are counted among the 706,000 jobs. ASBPA/FSBPA is largely comprised of the dredgers, engineers, agency personnel and sundry consultants who make a living off these high-dollar projects. A handful of dredging, engineering and environmental consulting groups score these lucrative contracts, and the projects encourage growth in agencies such as the Army Corps of Engineers, which relative to size enjoys one of the biggest budgets in government.

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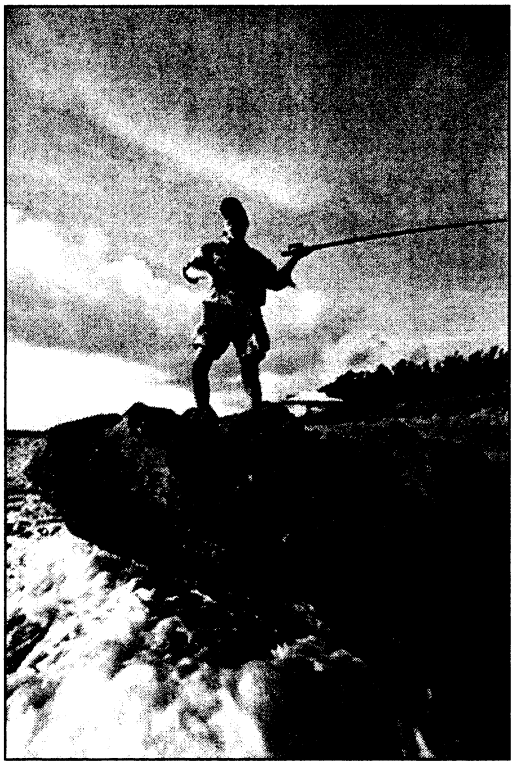
Many of these consultants and bureaucrats sit on conservation boards. They say the close relationships and partnerships facilitate the permitting process and help ensure better projects. Conservationists, anglers and divers say the dredging industry has become government.

"Agencies are working at cross puposes and individuals from the Corps, DEP and the consultants have clear conflicts of interests," said Dan Clarke, Director of Cry of the Water, a Broward-based coral monitoring and diving group.

Although the excessive dredging and pumping increasingly incense sportsmen, beachfront property owners demand the projects and some downplay the environmental impacts.



Reefs provide natural buffers and awesome angling.

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"We've been writing letters demanding re-nourishment of the mid-reach section [Brevard County] long before the hurricanes," said Cliff Dickinson, founder of Salvage Our Shoreline (SOS), a non-profit organization dedicated exclusively to getting a dredge-and-fill project on a nearshore reef system, declared Essential Fish Habitat/Habitat Area of Particular Concern, one with a 15-year history of protection.

"There ain't a fish in the ocean that can't live in a little deeper water," he said. Peer-reviewed studies that refute him include one entitled Nearshore Hardbottom Fishes of Southeast Florida and Effects of Habitat Burial Caused By Dredging. It states, in the contexts of snappers and grunts on the windward side of barrier islands in East Florida, "There are no other natural habitats in the same nearshore areas that can support equivalent abundances of early life stages."

His team mobilized some condo owners for a county commission meeting, where Commissioner Jackie Colon said she would "crush" anyone who opposed the project.

According to the SOS website, a campaign objective is to, "Identify and publicize the contact information of any potential roadblocks." A California-based surfing group called Save the Waves went to bat for disenfranchised local surfers, anglers and divers and filed an official letter of complaint about Colon's language and Salvage Our Shoreline's tactics. Next month, we explore why more sustainable coastal management tools aren't being used.

Investigative Series: 2 of 3. [Read part I]

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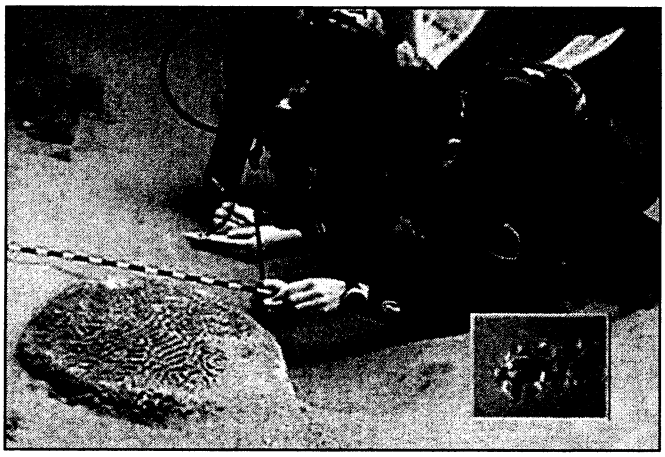
Poor Results Prove Need for Overhaul of Beach-Fill Policy



Tampering with beach composition and topography jeapordizes nearby coarl reefs and engdangered sea turtles, inset.

But, experts say that a one-size-fits-all, big-square-template actually harms turtles. According to Duke University geologist Dr. Orrin Pilkey, filled beaches erode two to twelve times faster than native beaches, and leave high dropoffs, called escarpments, that turtles can't climb. The long beaches can cause "false crawls," and if compacted, sediments can make it difficult for adults to dig nests and juveniles to climb out. Plus, the dark material elevates nest temperatures—turtle sex is determined by nest temperature.

One avenue to reform involves defining a healthy beach by its natural attributes rather than by width. And that would entail DEP moving toward a system of beach-by-beach erosion analysis, and custom beach-fill templates.

"Look at the Archie Carr Refuge, look at Tortuguero, Costa Rica. The most productive turtle-nesting beaches in the world are narrow, high-energy beaches," said Godfrey.

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Other erosion-control engineering solutions have been implemented with varying success around the world. Sand transfer plants, such as those at Palm Beach Inlet, restore the natural littoral flow of sediments where jetties have interrupted the process. The world's most sophisticated sand transfer system, in Tweed River, Australia, annually deposits 600,000 cubic meters of high-quality sand—nearly half the volume of one of Florida's larger dredge-and-fill projects—on the downstream side of the inlet. But, so far, South Florida has only one major fixed transfer plant and it can't keep up with sediment migrating into the inlets, and its maintenance has been erratic. So, periodic inlet maintenance dredging is required. Generally, the sand in the inlets is of high quality, and can be used to re-nourish the erosion hotspots that invariably occur on the south side of jetties on Florida's Atlantic coast.

Offshore breakwaters that absorb wave energy have also been used to stabilize beaches. Dr. Kerry Black, an oceanographer from New Zealand, seems to have successfully stabilized a beach on Australia's high-energy Gold Coast, and in the process created excellent marine habitat. But not all coastal experts are sanguine about breakwaters.

"If you place a hard structure in the surf zone it will likely cause some erosion nearby," said Pilkey .

"We're still looking for the silver bullet," said DEP's Phil Flood.

It seems that sound sustainable development policies and a retreat strategy are the only medium- to long-term ways to have healthy beaches and navigable inlets.

"In places where the shoreline is critically eroding, beachfront property is sort of like the new swampland in Florida. We don't really know how long it's going to be there, and you're taking a great risk by buying, building or living in these hazardous areas," said Godfrey.

California and North Carolina have both set managed retreat precedents, but Florida has yet to address this issue (see managed retreat case studies at www.kqed.org/coastalclash.)

"We need to explore incentive-driven ways to move back in some areas, in ways that aren't confrontational, through programs such as tax advantages and conservation easements," Godfrey said.

Many interest groups spent 30 years convincing the Corps that shoreline armoring isn't sustainable, and even the American Shore and Beach Preservation Association (ASPBA) may support some alternatives to seawalls and massive dredge-and-fill projects. Marlowe, for example, is excited about an artificial reef/breakwater pilot program in California. And, outdoorsmen working under the ASBPA aegis suggest a different tack.

"Shorelines are dynamic, and the concept of allowing the shoreline to retreat conflicts markedly with 'static' perspectives and perhaps also the short-term nature of politics and lobbying considerations," said Bob Battalio, a waterman, coastal engineer and California Shore & Beach Preservation Association board member. "I think this is the 'undercurrent' that's pulling us down and it needs to be addressed."

But in response to the second report, Howard Marlowe sent Florida Sportsman the following email.

"Perhaps you will find this 'appalling.' I, however, find your poor excuse for journalism to be appalling," he wrote.

As noted in the second report, Marlowe aggressively attacks anyone who questions the environmental impacts or the social/economic equity of large-scale coastal dredging. We suggest the really appalling claims reside within Marlowe's uniquely arrogant and ignorant press releases, for example the absurd attacks on independent biologists in a March 2004 press release (go to www.floridasportsman.com).

Influential lobbyists may try to drown the voices of recreational users, independent scientists, and taxpayers far from beachfront properties. But the author and editors associated with this investigative series are comfortable in asking rigorous and overdue questions about the excessive reliance on massive dredge-and-fill projects for erosion control, serious conflicts of interest that result from the dredge lobby and associated consultants governing our beaches, the continued denial of any possible impacts to reefs and fisheries, and regulatory impotence stemming from the Army Corps of Engineers' uniquely powerful tripartite position as advocate, funder, and permitting body for massive dredging projects.

Florida Sportsman will keep a badly needed spotlight on Florida coastal management, and we encourage readers to come to us with their concerns.

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Poor Results Prove Need for Overhaul of Beach-Fill Policy

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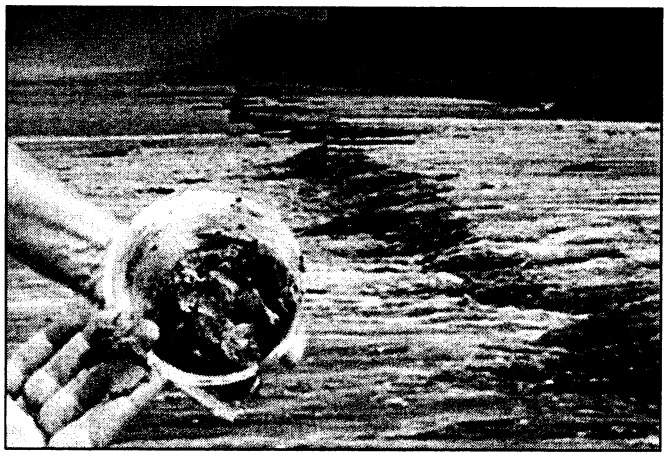

"A permanent time release of mud, "is how a visiting geologist described the goo dumped onto St. Lucie County beaches in April. The claylike stuff came from a site miles inland.

As this summer approached, bulldozers bellowed smoke, dredges chipped away at the continental shelf, and millions of cubic yards of sediments were deposited on Florida beaches. The Florida Dept. of Environmental Protection (DEP) had permitted 34 dredge-and-fill projects for beaches around the state. Among these, a rapid shoring up of beaches in St. Lucie County, affected by last fall's Atlantic hurricanes.

In April, Coastal Planning & Engineering had sediments trucked in from an inland mine at the corner of Indrio Road and I-95 for a shoreline restoration project in St. Lucie County. Typically, the mine produces roadbed material, mostly clay, fine sediments and crushed rock. The sediments were steamrolled into a hard-packed berm onto the beach face. St. Lucie beaches have ranked second in turtle nest numbers in the state and boasted vast, healthy nearshore reefs. The beaches are famous for pompano fishing.

Dr. Hal Wanless, Chair of Geological Sciences at the University of Miami, drove up to inspect the damage.

Wanless said, "The sediment they put down here is unsuitable. There are clods of clay and such a high proportion of fine material. It has nothing to do with the beach sand on any of Florida's beaches. This is going to be a permanent time release of mud into the system."

For weeks, water color and consistency resembled diarrhea along Hutchinson Island.

"But it met DEP standards," insisted Richard Bouchard, St. Lucie County's coastal engineer. Bouchard is a director on the board of the Florida Shore & Beach Preservation Association, the organization that lobbies state and local legislators for coastal dredging and related "shore-protection" projects. Martin County engineer (and Chair of FSBPA) Don Donaldson hadn't visited the St. Lucie site, even though only an arbitrary county line divides Hutchinson Island and Martin County's tremendous fish habitats, directly downstream.

DEP is analyzing the sediments, and Dr. Wanless doubts they meet DEP standards, which Debbie Flack (FSBPA's lobbyist) helped write, and which Wanless says aren't strict enough. He also analyzed the sediments recently placed over four miles of Martin County beaches, in the proximity of some of the state's most biologically diverse nearshore reefs.

"Contrary to what the people who are promoting this practice are saying," said Wanless, "both the St. Lucie and Martin County projects will erode rapidly, and turbidity is going to be a serious problem for a long while. The finer sediments will smother reefs."

At the southern end of Florida's Atlantic coast, yet another debacle ensued.

In April, Army Corps of Engineers Project Manager Penny Cutt, and John Studt, Chief of the Corps' regulatory branch, kick-started an 11-mile project in Broward County. Permits required contractors to transplant 2,000 doomed corals, required extensive pre-construction monitoring of these transplanted organisms' health, and required the distribution of education modules for dredge operators on techniques for reef protection. As of May 1, only a few hundred corals had been transplanted—none successfully. The monitoring

hadn't been completed, and the Corps passed out education modules only after the Environmental Protection Agency (EPA) and National Marine Fisheries Service (NMFS) sent stern letters.

At left is natural sand from a beach north of Fort Pierce Inlet; at right is offshore borrow material that was pumped onto Martin County beaches. Given a shake, the natural sand settled out in seconds, while the borrow material fouled the water indefinitely.

"The contractor destroyed existing nearshore hardbottom with giant bould-ers they brought in to imitate low-relief reefs," said Dan Clarke, director of Cry of the Water, an independent monitoring group.

"They're just big, algae-covered, slimy boulders," said Dr. Ray McAllister, Professor Emeritus of Ocean Engineering at Florida Atlantic University, and author of the popular dive guide, McAllister's Guide to Reefs. "A few of the transplanted corals are alive, but they have white plague. In short, the mitigation is a dismal failure."

"We're hoping to resolve this locally," said Miles Croom, from NMFS Habitat Conservation Division. NMFS recently proposed elkhorn and staghorn corals for listing as threatened species under the Endangered Species Act. Acres of staghorn are threatened by the Broward project.

In certain areas, appropriate beach-fill projects may be necessary to maintain turtle and shorebird nesting habitats. But Wanless and other leading geologists say that if maintaining biological diversity in coastal Florida is a goal, more rigorous testing for sediment compatibility and durability is a must.

"For lots of reasons what's good for turtles is good for Floridians," said David Godfrey, executive director of the Caribbean Conservation Corporation, our nation's oldest sea turtle conservation group. "Like people, turtles need clean healthy beaches, sandy dry areas, clean water and healthy reefs."

Howard Marlowe, a Congressional lobbyist, often touts massive beach-fill projects as turtle-habitat restorations.

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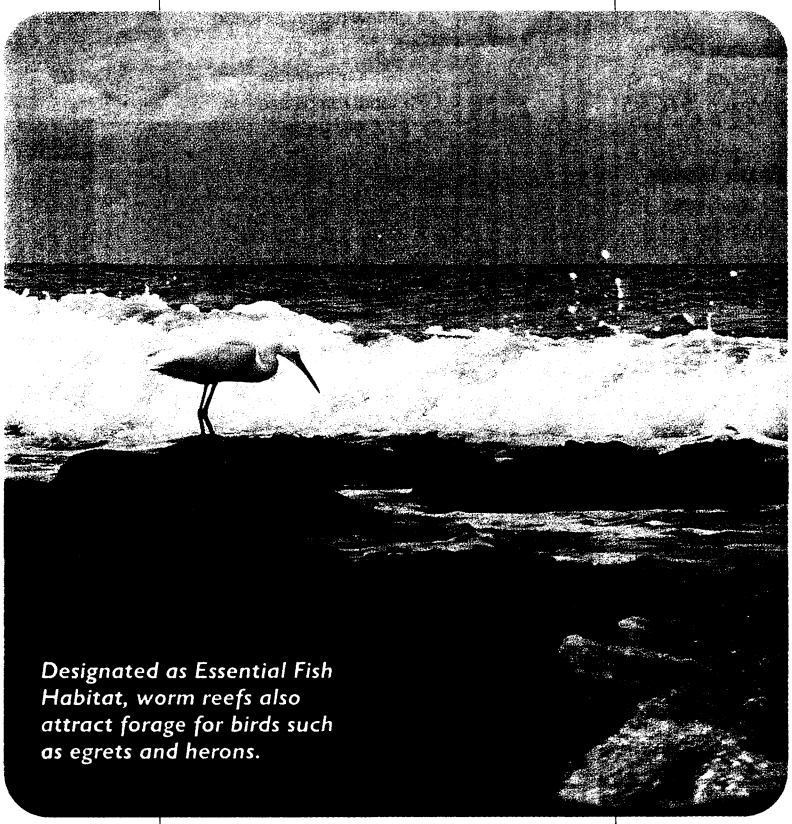
By Terry Gibson, Managing Editor

OCEAN Masons

Florida's best beach fishing, and the animals responsible for it.

He's a bit crotchety, but for an old bird Captain Lucky cuts a rakish figure, literally. Whenever I spot this 4-foot-tall blue heron perched like a statue atop a familiar inter-tidal reef off Palm Beach, Florida, I know there's bait there and that I'm likely to catch something.

I call him, "my native guide," but Lucky is obviously sick of my horning in on his honeyhole. He squawks a little louder each time I approach, and I suspect it's only a matter of time before he goes Alfred Hitchcock on me. Last evening, when I fired a jig into the school of finger mullet milling just out of his beak's range, the ornery cuss bowed up on me, and cocked his long bill in the attitude of a middle finger. I only wish my feathered friend could understand how much I appreciate what his guidance has helped me realize about nearshore reef ecology and surf fishing in Florida.



Designated as Essential Fish Habitat, worm reefs also attract forage for birds such as egrets and herons.

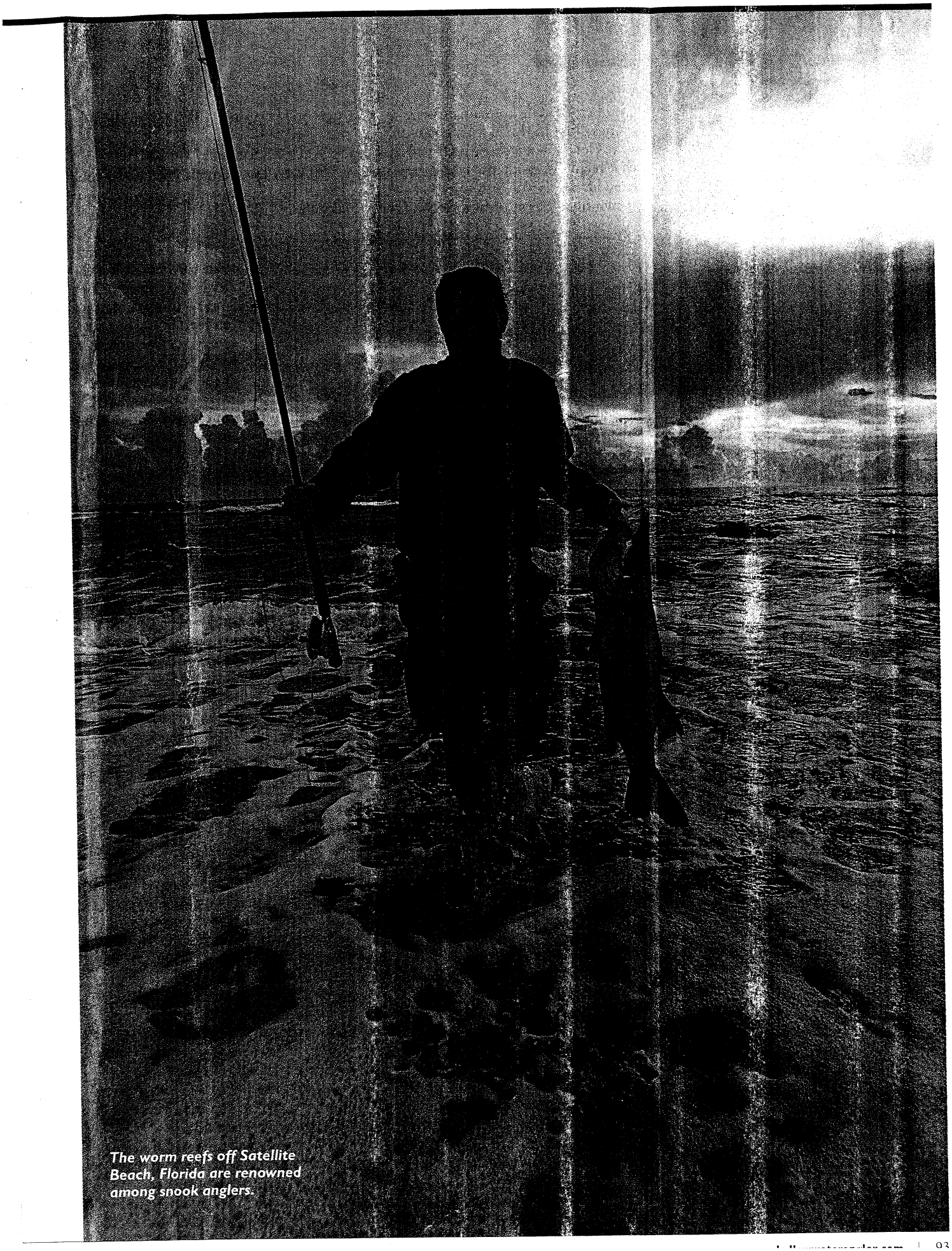
Lucky Reef, as I dubbed it, looks like a series of partially submerged honeycombs. As a kid, I thought the reef had no more significance than as a vantage for wading birds and as an ambush point for gamefish. I simply kept fishing the reef because it almost always produced gamefish, including snook, tarpon, jacks, bluefish, Spanish mackerel, ladyfish, pompano, blue runners, gray snappers and the odd grouper, depending upon the season. But it wasn't the only reef I fished, and I noticed that both birds and gamefish prefer segments of "honeycomb" reef over more dramatic slabs of exposed limestone.

Native Floridians call the stuff "worm reef," and the "honeycombs," are the submarine and inter-tidal "condominiums" built by *Phragmatopoma lapidosa*, a gregarious species of polychaete worm. Clearly, gamefish are attracted to *P. lapidosa* colonies. And if I can offer you one piece of surf fishing advice for East Central or Southeast Florida beaches, search out worm reefs. But I had never fully realized why they are so productive until I recounted my observations to fellow Palm Beacher, *P. lapidosa* expert and Jacksonville University professor, Dr. Dan McCarthy. McCarthy lit up like a Christmas tree when I told him that beach fishing is especially good around *P. lapidosa* colonies in the late spring and early summer.

"There's a higher abundance and diversity of fish and invertebrates that occur around *P. lapidosa* colonies," he said. "The worm colonies are an important piece of the puzzle," said McCarthy.

Think of *P. lapidosa* as an ocean mason. The worms select larger sand grains with their tentacles for bricks, and smaller grains for gaps, then secrete a "mucoprotein," a mucus mortar. In short, they build lots of nooks and crannies for crevice-dwelling fish and invertebrates to live in.

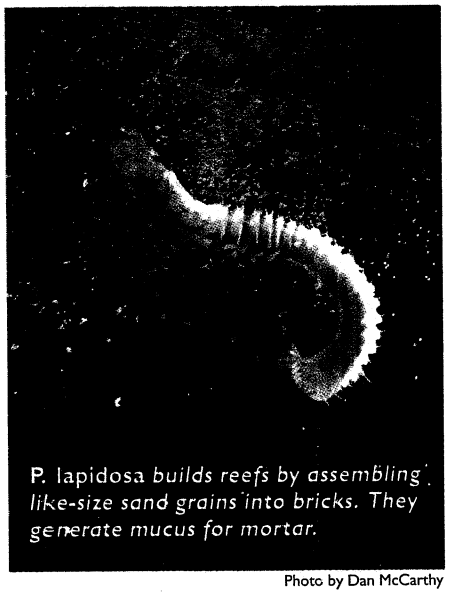
From late April through early



The worm reefs off Satellite Beach, Florida are renowned among snook anglers.

October, the Gulf Stream current swings close to the Florida coast, and sows Florida's nearshore reefs with fish that have just made the transformation from larvae, larvae that were born at spawning aggregation sites around the Caribbean and carried to Florida on the Stream. More than 530 marine species have been documented on these reefs, including 320-odd animals. And during the warm months, biological diversity and abundance reach peak proportions.

P. lapidosa has evolved to facilitate maximum fish recruitment during the peak season. New worm recruits settle in the winter and early spring and get busy building reefs in anticipation of the summer campers, so to speak. Then,



P. lapidosa builds reefs by assembling like-size sand grains into bricks. They generate mucus for mortar.

Photo by Dan McCarthy

swells from hurricanes and nor'easters partially break up the mounds, but it is thought they reappear in the same places each year because the adult worms leave a chemical marker for the next generation to home in on.

Several species of amphipods, tiny lobster-like crustaceans that are a vital food source for juvenile carnivores such as grunts and snappers, thrive in worm reef. So I asked McCarthy if he saw more hungry newly settled grunts, snappers and other reef fish than on limestone reefs.

"Let me show you," he said.

So early last summer, McCarthy took me diving on a nearshore reef off Vero Beach, in Indian River County. This particular reef is impressive, but a bit deeper than the baby fish usually like to settle on. The bottom is about ten feet down, but massive limestone outcrops reach within a few feet of the surface, recreating a complex surf-zone habitat 200 yards offshore. Some of the outcrops are triangle-shaped; others seem to sprout from the bottom like humongous lithified toadstools. Algae and a few hardy corals cling to the rocks, and we saw older juvenile grunts, sergeant majors and adult blennies foraging or hiding around the limestone. But wherever *P. lapidosa* had built a colony atop the substrate, the water teemed with fish. Clouds of translucent, centimeter-long grunts, snappers and newly settled porkfish hovered close to this submarine condo complex, swirling around each other brilliantly, like the white sparks of a sparkler. But a sinister shadow moving under a ledge distracted me. Diving deeper, I peered under the ledge and came face to face with a set of lips that looked like a bottle opener. *Centropomus undecimalus*. Common snook.

> I peered under the ledge and came face to face with lips like a bottle opener. Snook.

The only visible prey were those juvenile reef fish, and after similar snook and tarpon sightings on other dives I know why I catch more gamefish in spring and early summer on little flies, such as the popular Norm's Schminnow, an impressionistic minnow fly. Next summer, I'll paint a few faint black stripes down the sides of such flies to imitate the most abundant of the demersal grunts, the tomtates, and maybe put a tiny black dot on the tails of a few to imitate the baby lane snappers. The bottom line is that at times our favorite gamefish feed on far prettier and much more habitat-specific fish than mullet and sardines.

I forgot to mention that Capt. Lucky has run out of luck, and will have to compete with the younger herons that lay claim to the few remaining nearshore reefs as their honeyholes. In

Photo by Dan McCarthy

Worm mounds are essential for reef and gamefish, sea turtles and crustacean

November, the Army Corps of Engineers will dredge-and-fill Lucky Reef for the high purpose of "shoreline protection," even though the beach-width has been stable, even accreting in places since my parents learned to snorkel there in the 50s.

Despite National Marine Fisheries Service designations as Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC), the dredge lobby and terrestrial condo inhabitants dismiss nearshore reefs and *P. lapidosa* colonies as "ephemeral habits," while pointing out that some of the limestone substrate would not be exposed had jetties and seawalls not accelerated erosion rates. But these animals evolved along with Florida geology, and geologists confirm that exposed substrate and *P. lapidosa* colonies have existed throughout Florida's geological history. The "beach nourishment" advocates point to the worm's hardy nature, and the Corps seems to think they can throw a few rocks out, call it mitigation, and that *P. lapidosa* will colonize the rocks quickly. I'm not aware of any mitigation reefs that have been colonized by *P. lapidosa*, but am fully aware that after burying Lucky Reef, which is actually called Phipps Park, the Corps wants to turn its bulldozers toward the northernmost colonies in Satellite Beach. (*P. lapidosa* colonies range as far as North Carolina, but are effectively limited in terms of year-round habitat value to Florida, parts of the Caribbean and northeast South America. Related species perform similar functions on a much smaller scale in the Mid Atlantic and Northeast.)

"I'm very comfortable saying that worm mounds provide very important fish habitat," McCarthy said. "We don't yet fully understand worm larvae sources, larvae distribution and settlement well enough to be knocking off colony after colony and be confident of recovery." SWA